scientists that they were not able to separate the uranium isotopes on a large scale. Although they had managed to weakly enrich small amounts of uranium, a U235 bomb required about fifty kilograms of highly enriched uranium. During our research, we did not find any evidence that such a quantity of U235 had been successfully obtained.

What is interesting about the design is that the more elegant implosion arrangement was chosen instead of the primitive cannon barrel arrangement in which two subcritical masses are shot together. A uranium ball is compressed to criticality by the simultaneous ignition of several explosive charges.

The design principle described corresponded in its basic pattern, if not in all details, to the first American plutonium bomb. When discussing the design features, we learned that even before 1945 not only the two well-known principles – gun barrel and implosion type – were under discussion, but dozens of variants , was up to date. It is enough to compare illustrations of the first American implosion bomb with the German model to see the resemblance.

From this one can draw the conclusion that people in Germany knew how to build an atomic bomb. In the light of the post-war debates, where this was vehemently disputed, this is a sensational finding.75

A crucial question cannot be answered on the basis of the available documents – how many U235s were available in total. The degree of enrichment is also not mentioned.76 For a nuclear bomb, you need U235 that is as highly enriched as possible. Fifty kilograms are considered to be the critical mass for at least ninety percent enrichment. If such a bomb had been detonated, there would have been a huge explosion in Thuringia comparable to the Hiroshima bomb. There can be no question of that.

Kurchatov counted in the case of the ignition of five to ten kilograms of U235 or plutonium, he had not yet determined the critical mass more precisely, taking into account reflectors

a TNT equivalent of ten to fifty thousand tons.77 He therefore had doubts as to whether the German design description was correct in every respect.

But even with weakly enriched material (at least ten percent enrichment) a chain reaction can be set in motion.78 There is no doubt that Diebner had enriched uranium at his disposal. Whether this came from Harteck's centrifuges, the mass separators of the Reichspost or some other system is irrelevant at first.
However, we rule out several hundred kilograms of low-enriched U235, which would have been necessary for the construction of a uranium bomb based on the principle outlined above.

To emphasize it again: The Soviet military intelligence service GRU had gained knowledge of a German atomic bomb.
The description, in particular the weight, indicates a type of bomb such as that Schumann had presented at the autumn conference in 1944. However, this may not have been the last status.

As we know, the group around Schumann/Trinks concentrated entirely on the construction of a thermonuclear bomb.

Thanks to a sophisticated igniter arrangement, no fissile material should be required at all. While all later H-bomb designs required an atomic bomb as a "squib", Schumann/Trinks believed they could do without it. Schumann regarded the aluminum spheres, which weighed several tons, only as an interim solution. His group, and certainly also the researchers from the Navy and the Air Force, were already working on more elegant solutions and favored smaller cylindrical configurations. Now, in December 1944, Schumann's group was eliminated from the further course of events. We can therefore only assume that their research approach was completed by the scientists working with Gerlach. This is indicated by a marginal note on Schumann's manuscript. Ironically, at the point where he describes the stop for drinking, it is handwritten: »Otto Haxel«.79 Gerlach, Haxel and Diebner have certainly supplemented the drafts of the HWA with their own

ideas. We do not know the last details and therefore cannot give a definitive description of the bombs tested in Ohrdruf. But there is much to suggest that

they were bombs with fusion material that worked according to the shaped charge principle. A small amount of fissile material, such as uranium platelets, may also have been used. A mix of fissile materials may also have been used. In any case, it must have been much less than would have been necessary to reach a critical mass. The limited radius of action of the explosion and the isotope analyzes allow the conclusion that these were experiments with subcritical arrangements. Nuclear fission also takes place here, but the chain reaction stops after a short time – time is very relative in this context, since the processes take place in microseconds.

The cylinder-type bomb was probably fitted with a reflector. Metallic U238 and beryllium are suitable for this. This was known to physicists since Bothe's studies on the properties of beryllium. He spoke of the fact that beryllium was also "important for certain applications".80 This is how militarily relevant uses were described at the time. Gerlach had already discussed the tamper idea in 1944.81 We therefore assume that the bombs tested in Ohrdruf had a neutron backscatter jacket made of U238. The high proportion of U238 in the soil samples provides clear indications of this.

An important statement is found in the last paragraph of the March 23 report. There, uranium irradiation with gamma rays is mentioned – the reporter speaks of a facility with a maximum of 6 MeV, which is said to have achieved a "several increase in explosive capacity". This is true – for the irradiation of metallic uranium, the decisive factor is the duration of the irradiation. The gamma rays produce an excess of protons which is able to release neutrons from the irradiated material and initiate a conversion process.82

Let's remember the technician group of the AEG high-voltage institute, which was subordinated to Gerlach and Diebner in the spring of 1945, and the disappeared 5-million-volt high-voltage system. For the irradiation process, the AEG system or another system like the one designed by Wideröe came into question. We were able to get the final clarity about the radiation path

cannot be obtained, as there is no longer any evidence of this.83 What can be said is that pre-treating the reflector material made from U238 was definitely worthwhile.

Based on the soil samples, a fusion reaction can hardly be detected after sixty years.

At this point, reference is again made to the whispering gallery outlined by Gerlach. The art of building a thermonuclear explosive device consists in focusing the X-rays from the nuclear fission onto the fusion material.84 An ellipsoid is particularly suitable for this. We do not know whether Gerlach's idea played a role in the experiments. But the very fact that he indicated the basic principle for building fusion-enhanced bombs is remarkable.

In the USA, too, people have been thinking about fusion-enhanced nuclear fission bombs (booster type) since 1941.85 These should not be confused with a super bomb, i.e. a hydrogen bomb.
While with an H-bomb a relatively small fission energy can in principle release infinitely large fusion energy, the booster type releases only a relatively small fusion energy. In such an arrangement there is fusion material, preferably Li6D, in the center of the fissile material. Neutrons from nuclear fission convert the Li6 into tritium, the fusion mass is heated and fused, which in turn produces neutrons that accelerate the course of the chain reaction (fission-fusion-fission).86 The effect is an increase in the energy released .87 Such bombs were first tested in the USA in 1951. Modern nuclear weapons are mostly built as combination weapons.88

The scientists around Gerlach had obviously succeeded in acquiring a great deal of knowledge about fusion processes in a short time. How far people had come in 1945 cannot be clarified with absolute certainty.

Let's summarize the results of our considerations: The scientists had a certain amount of enriched U235 at their disposal. This fuel was cast in the form of half-shells, a plate or ellipse, and placed near the center of a cylindrical array. Smallest amounts of lithium deuteride or lithium hydride and one about

hazelnut-sized source of polonium-beryllium.89 Highly explosive explosives in the form of shaped charges were arranged at the ends of the cylinder. With their help, the energy of the explosive was concentrated on the center of the cylinder.

However, and this is the decisive difference to a large atomic bomb, there was no self-sustaining chain reaction. To achieve a critical configuration, larger amounts of more highly enriched fissile materials would have been required. Experts therefore speak of tests with a below-critical mass.

We assume that a subcritical mass exploded in Ohrdruf. Such an explosion is also a nuclear process that, in addition to heat and pressure, releases radioactive radiation and far exceeds the effects of conventional weapons. While the effect of supercritical arrangements is primarily based on pressure and heat, these effects are smaller in the type of bomb described. The radiation effect could be comparable to the effect of a neutron weapon, as Professor Seifritz suspects.

Further conclusions can be drawn from the deliberations on the bomb construction: The scientists must have known that their tests would not lead to a continuous chain reaction, otherwise the choice of location would have had catastrophic consequences. Furthermore, it can be assumed that the tests in Thuringia were not the first. The radius of action of the explosion must have been estimated beforehand. We know at least one test on Rügen.

The March 23 report also contains a reference to a light-alloy "hood" that might be fitted to the outer shell of the bomb to allow installation in a missile. The principle of the nuclear warhead presented here sounds adventurous. But the designers had a clear goal. They wanted to equip a missile with a nuclear warhead.

The test in Thuringia was far removed from the effect of the Hiroshima bomb. German scientists were on their way to developing a tactical nuclear weapon. It was the beginning of a journey of progressing from test to test, comparing the results to the theory, modifying it, and retesting.

The development of tactical nuclear weapons, begun during the war, was not the focus of armament during the Cold War era and the policy of nuclear deterrence.
Nevertheless, work was already being done on such weapons in the 1950s. As early as 1952, it was not an American or Soviet trade journal that published an informative article, but rather the German trade journal »Wehrkunde«: »Since we have succeeded in overcoming the so-called critical amount, very small dosages are also practically possible. In addition to the large atomic bombs, which have the purpose of having large-scale effects, there are baby bombs and projectiles, whose effective range is much smaller. The finer distribution of the explosive material that is now possible increases the overall efficiency when using a certain amount of fissile material. In addition, this has enabled both strategic and tactical use of the nuclear weapon.«90 Three years later, in 1955, an article by Dr.-Ing. HV Hajek in the magazine »Explosivstoffe«.91 Hajek writes in it about hollow atomic charges. Five years later, he published a lengthy article in the »Wehrtechnische Monatshefte« in which he stated that he had worked for the French Atomic Energy Ministry since the end of the war: »At that time [1946!] this nuclear hollow charge process was examined by the French High Commission for Atomic Energy within the War Ministry and held back. Due to military-technical decrees and reasons, it is currently not possible to provide precise information about the order in which the tests were carried out and subsequent follow-up.«92

Despite extensive research, we have not been able to clarify the true identity of the author. The name Hajek is not known to older employees of the ISL in Saint Louis, nor does it appear in the personnel lists of the various weapons offices. Obviously someone wrote under a pseudonym.

Sixty years from now, we will no longer be able to clarify without a doubt the principle by which »Hitler's bomb« worked. The construction plan passed to the Soviets indicates a way to a functioning atomic bomb, but for its realization

the necessary amount of fissile materials was missing. The second and, from our point of view, more practicable way for Gerlach and his scientists was via shaped charge technology. The fundamental research of the "hollow charge popes" Trinks and Schardin, the principles of synchronous ignition set out by Schumann and the working group "Maximum Pressures" of the Naval Weapons Office, the Munich University and the Grona company in Göttingen should be recalled again. We know that the Grona company, with 40 specialists, produced such high-pressure bodies that roughly correspond to the dimensions given by the contemporary witness Rundnagel. In Gerlach's duty calendar, these cylinders reappear in the context of fusion equations.

Was the research into atomic hollow charges a special German approach? no In the USA, too, attention was devoted to the development of nuclear shaped charges in the late 1940s and 1950s. Thomas Poulter was particularly involved in this. Using the Mach effect, he observed

nuclear reactions with a cylindrical hollow charge.93 Successful laboratory tests on this were also carried out in the Soviet Union in 1955. However, neither the Americans nor the Soviets continued down this path. They had atomic bombs and thus had the "squibs" for the more effective H-bombs. They did not need the basic principle developed by the German scientists for detonating an H-bomb.

2. The final

Hitler hopes in vain

In January 1945, even Minister of Armaments Speer began to abandon his hopes of a turnaround in the war and began to counteract the "scorched earth" tactics ordered by Hitler « worked towards the end of the war.95 On February 6, Hitler spoke to Goebbels about the defense of Berlin.96 They also discussed the evacuation of government agencies to

Thuringia. Hitler himself was determined to stay and defend the city. In the meantime, however, his maxim »No capitulation!« met with a lack of understanding even among the closest management circles. Chief of Staff Guderian wanted to capitulate in the West and only continue fighting on the Eastern Front. Hitler refused indignantly, although he knew that Foreign Minister Ribbentrop was trying to enter into talks with the Western Allies via Stockholm, Bern and Madrid. Peace negotiations with the Allies were not possible as long as Hitler was alive.

On February 20 and 21, Kammler was with Hitler to report.97 Kammler's adjutant, Heinz Schürmann, recalled that Bormann had to leave the room on February 21.98 Hitler wanted to speak to Kammler in private. After the conversation, the otherwise very secretive Kammler repeated a sentence from Hitler to Schürmann: "Kammler, if what you're telling me is true, then the war is lost. " have pointed out. He still couldn't report a successful test. Hitler had no choice but to hope that the work would continue. Therefore, he could only give general hints about new wonder weapons, which was to be revealed three days later.

On February 24, 1945, the traditional

national celebration of the founding of the NSDAP. The Gauleiter, Reichsleiter and association leaders were invited. Even the most loyal Hitler supporters began to have doubts about the ultimate victory. In small rounds, Hitler's isolation was criticized and Bormann was held responsible.100 When Hitler entered the hall,

the party leaders were shocked. He looked senile. His speech was powerless. Hitler looked back on the history of the NSDAP and only briefly touched on the dramatic war situation in the last third of the speech. Even when he promised a turnaround in the war through the use of new weapons, he was no longer able to rekindle the enthusiasm that had once existed. His speech contained a most remarkable passage. He explained that the retaliatory weapon and "something else that I already have" will change the whole situation in Germany's favour.101 But what did he mean when he suggested that he had "something else" at his disposal? He wanted to convey hope to the Gauleiters that Germany was close to completing atomic bombs.
However, the Gauleiters could not take Hitler's vague hint.

As early as February 1945, Hitler had begun to compose a kind of legacy. From this paperwork, which dragged on until April, Bormann knew that Hitler viewed military defeat as almost inevitable. Hitler hardly ever left the Führer bunker and fled more and more into an illusory world. He hoped to turn the military situation around with armies that only existed on paper. It was the same with the new weapons. The new jet fighters, missiles, and submarines were there, but without fuel, launch pads, and experienced pilots and commanders, what was their value? Even the use of some of the new bombs would not have been able to change the course of the war. Only nuclear-tipped missiles would have been potentially extremely dangerous. But Kammler never got that far.

On the day the first test took place in Ohrdruf, left Surprisingly, Hitler left the Führerbunker for a few hours and went to the Oder front. On March 3, he visited the headquarters of the "Berlin" and "Döberitz" divisions.102 Hitler met the commanding general Theodor Busse at Schloss Freienwalde and swore to them

him to hold the front as long as possible: "Every day and every hour is precious to finish the terrible weapons that will bring about the turning point."103 Hitler finally allowed Goebbels that the pictures of his visit to the front could Appeared in weekly magazines, but the impression was given that the visit had taken place on Heroes' Memorial Day, i.e. on March 11, at the same time as Goebbels was traveling to the Oder.104 Heinrich Himmler was probably better informed than Hitler. His service calendar shows that he met with Kammler in Hohenlychen on March 6 and March 13, immediately after the bomb tests.105 After the first test, Himmler regained hope. His adjutant: "When Himmler was later with us in a small group, he sent for champagne and gave a short speech (...) I can't remember the exact wording, but he explained that all the work and the unbelievable sacrifices of the last few years had brought the expected success after all and that the critics would be belied if things got going anytime soon. (...) In any case, Himmler emphasized that nobody could resist this new weapon. (...) German science would therefore have achieved something actually impossible together with us....«106 His personal physician, Felix Kersten, who had returned from Stockholm on March 5 from a diplomatic mission on behalf of his boss, was amazed about Himmler's demonstrative optimism. Himmler explained: »Most people think we lost the war. I cannot deny that they have reasons for assuming this. But we haven't used our last miracle weapon yet. While the V1 and V2 are effective weapons, our ultimate silver bullet that we still have up our sleeves will have effects beyond our imagination. One or two shots and cities like New York or London will disappear from the face of the earth. Allied air raids destroyed many important factories for their manufacture. So we're behind schedule. But in a month or two they will be able to read all about it in the newspapers.«107

After Speer was informed of the destruction of New Yorks had spoken through a single bomb now took effect

Himmler up this plan. The successful test on March 3 was the last glimmer of hope. As long as there was still a chance for a surprise strike, Himmler and Speer clung to that thought.

On March 18, Speer came to Hitler with a memorandum. He saw the armaments industry on the verge of collapse, but nevertheless believed that "by persevering tenaciously on the current front for a few weeks, one could win the enemy's respect and perhaps still determine the end of the war in a favorable manner. " Hope for the new bomb with? Be that as it may, Speer's line was too soft for Hitler. His notorious destruction order to all departments had already been formulated and was issued on March 19th. It said: "All military, traffic, communications, industrial and supply facilities as well as material assets within the territory of the Reich which the enemy can somehow make use of in the foreseeable future for the continuation of his fight are to be destroyed."109 Hitler had that collapse of the Ruhr front in mind and wanted to take the German people with them into the downfall.

Speer, who received Hitler's order on March 20 on a trip to the Saar and the Ruhr area, no longer wanted to be involved in this final inferno. He considered the "Nero order" to be madness and knew that most industrialists thought so too. Sections of the business elite had long since begun preparing for the post-war period. Speer rushed to Berlin and tried in vain to persuade Hitler to change his mind. Afterwards he said to his colleague and closest confidant, Theodor Hupfauer: "Hitler is a criminal."110 Hitler's attitude hardened not only towards Speer. Meanwhile, Himmler's position had also deteriorated dramatically.

Hitler personally blamed him for the failure of the last German offensive in Hungary and also blamed him for the loss of Pomerania. It is unclear whether Hitler also heard about the rumors that Himmler secretly wanted to initiate peace negotiations with the Allies.

One thing is certain, the military layman Himmler was overwhelmed with the leadership of Army Group Vistula. Desperate about Hitler's

he fled to his sickbed in Hohenlychen in mid-March. There Guderian looked him up and suggested that he relinquish command of the army group. Himmler agreed and was relieved of this post on March 20.111 After that, he increasingly went his own way. He continued to try to establish contact with the Western Allies through Count Folke Bernadotte, Vice President of the Swedish Red Cross and a close relative of the Swedish king.112 The head of foreign espionage in the Reich Security Main Office, SS Brigadefuhrer Walter Schellenberg, had initiated the talks . Himmler agreed to the release of a small number of Jews and other prisoners, for him the camp inmates were mere objects of exchange.

It can be assumed that Himmler also wanted to bring some of the latest results of armaments research into the negotiations as a bargaining chip. During a sick visit in Hohenlychen, Schellenberg overheard Kammler and Himmler talking about the latest rockets and their disclosure to the Americans.113

While Himmler was taking care of the negotiations with Bernadotte and Speer was continuing his journey to the Ruhr region, where he was undermining Hitler's "Nero orders," Gerlach was surprisingly called to Berlin.

Gerlach reports to Bormann

In the night from March 21st to March 22nd, Gerlach was again in Stadtilm for a few hours. On the following day, events rushed. At 6:30 a.m. Gerlach flew to Berlin.114 What was the reason for his sudden journey, and then by plane, at a time when even generals were walking? The entries in Gerlach's service calendar provide no answer. The decisive date is not noted: a meeting with the Reichsleiter of the NSDAP, Martin Bormann. After Gerlach's plane landed on a makeshift runway in Berlin, despite a Soviet artillery attack, he rushed to the Reich Chancellery. We only know about this meeting because Gerlach made a memo about it, which the Americans got hold of at the end of the war. she

then asked Gerlach about the course of the conversation on March 22nd.

We will never find out what Gerlach really told the Reichsleiter of the NSDAP. He stated to the Americans that he had informed Bormann about the successful start of a chain reaction.115 This is one of the many legends from the history of the German uranium project. Gerlach knew very well that Heisenberg's reactor in Hechingen had not gone critical. But how was he to explain to the Americans that his notes contained evidence of a successful chain reaction? He cleverly withdrew from the affair and referred to the last reactor test in Haigerloch.

Did Gerlach talk to Bormann not only about Haigerloch, but also about the reactor in Gottow and the tests in Thuringia? In any case, after this conversation, Bormann entertained illusory hopes that atomic bombs would soon be used, and Gerlach dreamed of concluding a separate peace with the Allies.116

Did Bormann inform Hitler about the conversation? In his service calendar, Bormann noted that he and the Gauleiter of Thuringia, Fritz Sauckel, had been to Hitler on March 25 to report. A day later, Bormann met Himmler at noon and Sauckel again in the afternoon.117 In any case, after his visit to the Führer bunker, Gerlach drove to his office in Dahlem. A day later he attended a meeting at Ohnesorge's in Hakeburg. He explained to his surprised listeners that the war was as good as won. The enemy was suffering huge losses.118 Gerlach jotted down these in bullet points, which, given the actual military situation, were bizarre statements made by the Reich Postminister. Scarcely had he escaped the torrent of talk by Ohnesorges when he hurried back to the Harnack House to meet Graue, Fischer, Schumann and Colonel Geist at 5 p.m.119 A little later, Diebner joined them. Gerlach had specifically ordered him to Berlin. It was the last conversation among those who knew more about the tests. In the days that followed, Gerlach said goodbye to Buchmann, Thiessen, Mentzel, Juilfs, Schardin and Hertz. They had all supported Gerlach's work in one way or another.

Let's recall the date of the meeting again - March 23, 1945. On that day, of all days, the Soviet military intelligence service wrote an information about the tests in Thuringia. On the other hand, on March 23, Bormann supplemented Hitler's insane destruction order. Bormann's partisans pinned their last hopes on a "miracle weapon." Under the seal of the strictest secrecy, he had announced their imminent deployment.120 Was this under the impression of the conversation of March 22 between him and Gerlach?

On March 24, Gerlach met Paul Rosbaud for the last time. In contrast to their last meeting at the end of January, Gerlach seemed transformed. He was very enthusiastic about the reactor tests: »The machine works! This is a great victory, just think of the consequences, you don't need radium or petrol.' 'Too late, thank God,' said Rosbaud. "No," countered Gerlach, "a wise government aware of its responsibilities might be able to negotiate better terms." He still hoped that an unconditional military surrender would be avoided: "Because we know something of the utmost importance that others do not know . But we have a government that is neither smart nor has it ever had the slightest sense of responsibility.'121 Rosbaud shattered Gerlach's illusions. The war will be over in a few weeks. He ended their conversation with a warning: If Gerlach tried to wring concessions from the Allies through German success in nuclear research, they would have any scientist killed or imprisoned until they confessed everything they knew about the reactor or the bomb .

There is no longer any room for negotiation. Disillusioned, Gerlach left Berlin on March 28 and went to Stadtilm.

The March 28 meeting

After the tests at the military training area in Ohrdruf, it was still around three weeks before events came to a head. During these days the military situation of the Reich had continued to deteriorate dramatically. The last major one, begun on March 6, 1945

German offensive, an attack by SS divisions on Lake Balaton in Hungary, had failed. On March 23, the finals began on the western front. Eisenhower's troops crossed the Rhine in a broad front. Only a few days later the encirclement of the last large German formations in the Ruhr area became apparent. The front in the west began to break up. Hitler had not expected such a rapid collapse. He thought he was surrounded by traitors.

Fighting on the eastern front was far more fierce, but given the overwhelming majority of the Red Army, there could be no doubt about the outcome of the last major battle - the Battle of Berlin. The authority of Hitler, Goebbels and Bormann was no longer sufficient to prevent withdrawal movements from Berlin. In the end, Hitler himself agreed to a gradual "trickling out" of authorities from the Reich capital. The flight of the Reich authorities to Thuringia reached its climax at the end of March. This was vividly described by contemporary witnesses such as Reichsbahner Peter Fritsch. Fritsch served in Ohrdruf and Crawinkel between February and April 1945. He recalled an increasing hectic pace in his department: »At the end of March everything got serious. During the night of March 27 in Ohrdruf and Crawinkel, two other special trains had been unloaded by the SS personally with personal items from the Reich Chancellery , works of art and other things from the Reich Chancellery to Thuringia. There are entries about this in his service calendar.123

Bormann anxiously noted in his duty diary how far the American and Soviet tank spearheads had advanced. Nevertheless, on March 28 he still seems to have assumed that Hitler would give the order to move his headquarters to Thuringia. A day later this option was obsolete.

At the end of March, however, it was not just about the relocation of files and art treasures, but about more. According to the railroad worker already quoted, on March 28 Himmler, Speer, Sauckel, and others met in the »Deutsches Haus« inn in Luisenthal

and met other Nazi greats. There was indeed a meeting, but not in the said inn, which was in the middle of town.
The district party school of the NSDAP was more suitable for a meeting. It was hidden in the immediate vicinity of the railway hofs, before entering the town . 124 SS units and the SIII leadership staff had already been transferred there. Not far from the district party school there was an old manganese ore mine that had been prepared by concentration camp prisoners for the storage of goods. An interesting detail should be noted in passing: the son of the ore mine manager, Gerhard Laussen, served as Himmler's adjutant.125 Things got hectic at the end of March:

'Two SS men were deployed for every railwayman on duty. Every action had to be said before it could be carried out. At 11 o'clock all railway workers had to leave the station [...] A few SS jeeps drove around, two cars with flags in the village. The same troop drove back towards Gotha at around 2 p.m..«126

The day before, on the afternoon of March 27, four planes had landed at a small airfield not far from Ohrdruf: 'All intersections were guarded by SS guards. On March 28, a barrier was erected two hundred meters from the town exit in the direction of the military training area."127 Who was responsible for this effort? Several eyewitnesses suspected that one of the passengers was Adolf Hitler. That can be ruled out. Hitler sat in his bunker on March 27th and in the afternoon received Keitel and Guderian for a briefing.128

Where was Speer on March 27728? Speer's last meetings with industrialists and Gauleiters from the Ruhr area took place on March 25.129 On the evening of the 26th he left the Ruhr area and drove to Bad Nauheim.130 Shortly thereafter he went on to his hometown of Heidelberg. This trip is just as little mentioned in his travel and appointment calendars as his subsequent travel destination. The Americans were already in Mannheim, less than twenty kilometers from Heidelberg. Speer met with the mayor on March 27 and then wrote to SS General Paul Hausser asking SS General Paul Hausser to declare Heidelberg a hospital city that was to be handed over without a fight. The rest

he spent the night talking to his parents. In the early morning of March 28 he said goodbye. At breakfast he was already sitting with Gauleiter Dr. Hellmuth in Würzburg together. He spoke to the armaments minister about the use of a new "wonder weapon". Speer gave him no hope and traveled on. Innsbruck and Munich are listed in his original itinerary.131 But he wasn't there. The entries in Speer's service calendar for March 28 are also incorrect. He had scheduled a number of appointments in Berlin for that day, but only got there at 1 a.m. on March 29.132 Late in the evening of March 29, the often-described conversation between Hitler and Speer took place icy atmosphere and ended with Hitler begging Speer to believe in him. Speer stuck to his opinion: "The war is lost."133 Historians and journalists came across the wrong date of the Hitler-Speer conversation and correctly dated it to March 29 and not March 27, as Speer claimed, However, they did not attach any importance to the fact that Speer chose a route from Würzburg to Berlin via Thuringia. But this seemingly trivial matter is extremely important. The travel route led through small towns and villages, where the minister saw “Sauckel’s last contingent”: “Finally, in the towns and villages of Thuringia, party formations, primarily the SA, wandered around aimlessly on the streets in their uniforms. Sauckel alerted the 'large contingent', mostly older men or children, who moved aimlessly on the streets.”134 But what did Speer want in Thuringia on March 28?

Kammler was in Berlin on March 26, and on the 27th he traveled back to Thuringia.135 Not only Speer and Kammler were drawn there, but also Walther Gerlach. He drove from Berlin to Stadtilm at four o'clock in the morning of March 28.136 There he met two scientists from the PTR and Haxel. In his duty calendar, he noted that he worked until midnight.

Who had arrived on the planes on March 27th? Probably Heinrich Himmler. On the evening of the 26th he declined an interview with SS Obergruppenfuhrer Karl Wolff and pretended that he had to take the train to Vienna. Officially, his trip was for that

Visit to the 6th SS Panzer Army, which suffered defeat in its last offensive in Hungary.137 It is conceivable that Himmler did not come to Vienna by train but by plane, or at least covered part of the route by plane. This is indicated by Goebbels' diary entry of March 28: "Himmler flew to Hungary on his [Hitler's] orders."138 His adjutant, Grothmann, confirmed Himmler's trip to Thuringia at the end of March 1945 and a meeting with Speer.139

One thing is certain, on March 28, those responsible for the tests at the Ohrdruf military training area - Himmler, Speer, Kammler and Gerlach - were in Thuringia, and after that it was all over with regard to the new bombs. Now it was just a matter of surviving. Gerlach had the least to fear. He went to Munich and waited there for the end of the war.

Himmler now relied entirely on separate negotiations with the Allies. For months, exploratory talks had been going on in Switzerland and Sweden about SS Obergruppenfuehrer Karl Wolff, the head of the SD, Walter Schellenberg, and Himmler's personal physician Felix Kersten. Himmler seriously hoped to win the Americans and British over to a separate peace and to continue the fight on the Eastern Front.140 On April 21, 1945,

less than 24 hours after Himmler had last been to see Hitler in the Berlin Führerbunker, he met with the head of the Swedish section of the World Jewish Congress in Harzwalde. Two days later he declared in Lübeck Berna dotte his willingness to capitulate in the West. The British and Americans declined and made Himmler's offer public on April 28. Nevertheless, the rumors about a secret agreement between the Americans and the SS never died down completely.

The American Advance and the Flight

What happened to the scientists in Stadtilm? Although the tests had been successful, they remained militarily meaningless. There was probably no more material left for the construction of further bombs. Speer, Himmler and Kammler cannot do that

to have remained hidden. For them, the group around Gerlach and Diebner lost their value.

Incriminating files were burned by Diebner. He indicated to his employees that he hoped to be able to continue working with his temporary laboratory in Stadtilm after the end of the war or to open a radio repair shop.141 He said to Haxel: »If I get out of this corner of the forest alive, I will Call them.'142 But the war wasn't over yet.

On March 28, 1945, shortly before the end of the Ruhr operation, Eisenhower had made the decision on how to proceed with the campaign.143 He had part of his armies pivot to the southeast. This turn of events was also encouraged by rumors about the "Alpine Fortress". There was also information about the transfer of German staffs to the Thuringian area. Eisenhower's strategy was aimed at dividing the enemy's remaining forces in order to end the war quickly. He decided to let Patton's 3rd Army move into Thuringia from April 1st. An important milestone in the advance was Ohrdruf. The Americans suspected that there were German high command staffs in the vicinity of the city who wanted to imprison them.144

In Berlin, Thiessen had just received a telephone message from Gerlach, who spoke of a functioning "nuclear power machine," when news of the Americans' imminent advance into Thuringia reached him.145 The thieves' group was threatened with capture in Stadtilm. Thiessen informed the SD men Fischer and Spengler, who immediately made their way to Graue in the War Economics Office of the Reich Research Council. He sensed the danger and spontaneously exclaimed: "Yes, the atomic bomb must be removed from Stadtilm immediately."146 Finally, the head of the Reich Security Main Office, Ernst Kaltenbrunner, sent a column of cars led by Oberfuhrer Ehrlinger to march around Diebner's group and their material and their documents to the »Alpine Fortress«.

Hitler seems to have learned nothing of all this. He was still waiting for success reports from the scientists and relied on Kammler. On April 4, 1945, he was at Hit-

ler and then at Speer. While Kammler played the dashing general in the Führer bunker, he hinted at his plans for the future to Speer. The war was lost and it would be better to withdraw now.147 He wanted to get in touch with the Allies and offer them the latest armaments technology in exchange for his personal freedom.

Almost at the same time that Kaltenbrunner was organizing the transport, it must have been around April 5, two Gestapo officers turned up at Griesheim Castle looking for Kurt Diebner. His wife later said that the men had orders to shoot her husband. You would have told her so openly. They took it with a certain relief that Diebner was on the road.
Ms. Diebner got the impression that they wanted to disappear as quickly as possible and throw their telltale leather coats into the forest.148 It is reasonable to assume that Bormann and Sauckel were behind the Gestapo action.149 But Bormann's power base eroded from day to day day more. He was out of the game.
Not so the SS.

Ehrlinger's command reached Stadtilm on April 8, just before the American tank spearheads. While the institute was already being dissolved, several of Diebner's employees were still busy in Gottow. They probably eliminated the traces of the reactor accident. When this work was done, they set off towards Stadtilm with a heavy truck and trailer.
They had loaded personal belongings and a large quantity of paraffin. They reached the small Thuringian town on the night of April 8 and 9 and found their colleagues ready to flee.150 Shortly before they left,

Herrmann turned to Diebner and asked where they were going.151 Diebner was visibly nervous. He did not know. Perhaps, he replied, we should all be "killed."152 Diebner ordered the trucks to be loaded. Only the materials that were absolutely necessary for the continuation of the experiments should be taken with them.153 After all, his group still had about a ton of uranium metal, almost ten tons of uranium oxide, four hundred liters of heavy water, four grams of radium, two complete measuring devices and miscellaneous Laboratory Equipment.154

While a group of craftsmen and secretaries

made his way back to Berlin, Diebner drove to Weimar with the scientists.155 Only Berkei and Hartwig stayed behind in Stadtilm. The first station of the Diebner group was the Gestapo headquarters in Weimar. There the destination of the journey was revealed to them – Innsbruck. Kammler was also on his way there with his entire staff at the time.156 After Innsbruck was known as the destination, Diebner drove to Ronneburg to take scientists and materials from the PTR depot with him. The most valuable part of the cargo was the radium reserve of the German Reich, these 18 to 22 grams were worth at least two million dollars.157

The group then left for Bavaria with five trucks, two trailers and a car. It was only possible to drive at night without lights, so as not to attract low-flying aircraft. Daily destinations were mostly small towns. The vehicles were hidden in barns and a search was made for fuel wood for the wood gasifiers. In Bavaria, part of the uranium oxide had to be unloaded and hidden because the vehicles with the heavy load could not have coped with the mountains.

On the morning of April 12, units of Patton's 3rd Army occupied Stadtilm without a fight. With them came an Alsos group—scientists and intelligence officers sent to find out how far the Germans had gotten with their uranium project—led by Fred Wardenburg. They came across an abandoned nest. In middle school, the Americans found only one scientist - Friedrich Berkei. After interviewing Berkei for about three hours and leafing through some of the files he had left behind, Wardenburg drew up a telegram to Samuel Goudsmit, Alsos' scientific director, who was in Paris at the time. It began with a triumphant sentence: "Sos has struck again." Wardenburg informed his boss that they had struck a "gold mine" and that he should come to Thuringia as soon as possible. He listed: '1. dr Berkei, who has been involved in this project from the beginning. He reports everything and is also informed about Hechingen, 2. volumes of revealing files, 3. parts of the U-machine, 4. a lot of equipment.'158 But the finds wanted his exuberant comments

don't quite fit. She may have been blinded by the sheer mass of documents. Diebner had had the really important papers destroyed or had taken them with him, and Berkei didn't say everything he knew.

Outside the school there was still some paraffin and a pile of uranium oxide cubes lying around. When Pash asked people what that was, the answer he got was, "It's just pressed charcoal." He lifted one of the pieces and said only, "A little too heavy for charcoal."159 Individual compacts continued to dive years later in Stadtilm and gave rise to speculation.160 A good 20 years later, Gerlach explained: »Even then, it could not be determined whether all the uranium that was in Stadtilm was really transported away. But it is quite impossible that large amounts remained in Stadtilm.«161 Pash discovered a

pit in the basement of the school. He suspected that an experimental reactor should be placed in it. Right next to it was a container with a lead lid that was walled into the floor. This had served to store a neutron source. The Americans also found some laboratory equipment and numerous files in the school and the adjacent buildings. All in all, the remains of Diebner's "laboratory" looked pretty poor. After a few days, the Alsos group left Stadt ilm. They did not look at the military training area in Ohrdruf, which is an indication that they had not heard anything about the tests.

The end in Berlin

Last hopes of a turning point in the war were pinned on a break in the anti-Hitler coalition and surprising advances by ghost armies intended to relieve Berlin.162 Although he was aware of the hopelessness of the military situation, Hitler refused to see the reality. He secretly still hoped for the new weapon. Bormann had been informed by Gerlach, at least roughly, of the current state of affairs. There's no reason to assume that

Bormann withheld this from Hitler. At their last meeting on April 4, Kammler also seems to have encouraged Hitler's hope that all was not lost.

On April 19, Hitler told Colonel Hans-Ulrich Rudel that he still had something up his sleeve, and shortly afterwards he said to Speer's deputy, Karl Otto Saur: "This war will be decided within the next 24 hours."[163] Goebbels had already used a very similar formulation in January. Both probably alluded to the atomic bomb.

The hope for the all-important weapon was also confirmed by those closest to Hitler. After the war ended, his adjutants, doctors, pilots, bodyguards, secretaries, and other servants were interrogated by the victors. Various protocols and reports have only recently been released by the State Archives of the Russian Federation. In an effort to find out as many details as possible about Hitler's end, the Soviet secret service had those concerned spied on in their cells. Your statements made a few months after the capitulation have a high degree of credibility. They are not conclusive on their own, but taken together they give a rough picture of what Hitler knew about the atomic bomb. For example, Hitler's chief pilot Hans Baur reported that he had hoped up to the last moment "that Hitler still had a trump card in his hands to end the war happily. " always shown optimistic.

When asked about the atomic bomb, Baur said that he knew nothing about it, "but that Hitler was sure he could achieve victory with its help."[165] With caution, this can also be derived from an interview with

Hans Fegelein, Hermann Fegelein's father. getting closed. SS Group Leader Hermann Fegelein, Himmler's liaison officer at the Führer's headquarters from 1944 and Eva Braun's brother-in-law, was shot dead on April 28, 1945 for desertion. In September 1945, his father reported to the Americans about the dramatic last days of the war. Hitler was very upset that Himmler had withheld the new atomic bomb from him.

He wanted to bring about a turning point in the war.[166] In the interview

The protocol reads: "The engineers who were last at the Fiihrer's headquarters, and the Fiihrer himself, expected the atomic bomb to be used every day. But saboteurs prevented this."167 Hans Fegelein did not mention who the saboteurs were supposed to be.

The Americans did not believe his description of Hitler's desperate hope of getting hold of atomic bombs after all. They assumed, of course, that an "atomic bomb" could only be a weapon of the kind used against Japan, and Germany actually did not possess this weapon.

When Hitler received the news on April 22 that the advances planned to relieve Berlin had not taken place, he raged at the afternoon briefing. Hitler screamed that he had been betrayed by everyone he trusted. When he regained his composure, he sobbed, "The war is lost."168 On April 30, he committed suicide.

The Capture of the Scientists

While house-to-house fighting was still raging in Berlin and Soviet troops were approaching the Reichstag, the Alsos mission was on its way to its final destination - Haigerloch. Around noon on April 23, Pash and his people tracked down the rock basement and discovered the reactor pit. They informed their British colleagues, who arrived towards evening. The scientists realized that Heisenberg's reactor could not go critical, it was too small. Heisenberg's makeshift laboratory in a wool factory in Hechingen was found on April 24. The temporary quarters of the KWI for Physics were also occupied. All laboratory equipment, including the isotope separation systems by Erich Bagge and Horst Korsching, were dismantled and the scientists present were questioned. Goud smit only interrogated Weizsäcker once for about an hour. The German scientist readily answered all questions, but the American didn't seem particularly interested. At the suggestion that the scientists are doing their research under

control of the Americans could continue, Wirtz and Weizsäcker revealed the hiding places of their research documents.

The question remained of what to do with the captured German scientists. Hechingen, Haigerloch and Tailfingen would soon be part of the French occupation zone. General Groves was horrified by the idea that the Germans might be working for Frederic Joliot-Curie in the future. The French professor belonged to the Communist Party. For this reason, Alsos took Weizsäcker, Wirtz, Bagge, Korsching, Laue and Hahn to Heidelberg on April 27, to the American occupation area. This also ended this part of the Alsos mission. On April 30, 1945, Goudsmit received orders from Washington to discontinue further investigation of the Stadtilm documents, to compile them according to focal points and to send them to Washington immediately.169

Now Gerlach and his staff should still be found. On April 19, Gerlach received the news in Munich that an arrest warrant had been issued against him. Behind it again Bormann is to be assumed. Gerlach was no longer impressed by the last convulsions of the party apparatus. He was looking for Diebner's transport. On the night of April 26/27 he finally found Diebner's column in a small village between Bad Tölz and Tegernsee. Most of the SS escorts had already left or had been captured by the Americans.

Gerlach had a lengthy conversation with Haxel and Diebner. They decided to split the remaining group into four groups. The first, with Diebner at the head, was to go to Schöngeising. The second went to the Physics Institute in Munich under the direction of Gerlach and Haxel. Gerlach took some of the uranium and heavy water with him. He also had half a million Reichsmarks paid to him in cash by the office of the Reich Research Council that had been evacuated to Bavaria. When Gerlach said goodbye to Haxel in Munich, he still gave him the advice: "Hide yourself."170

The third truck should still try to get to Innsbruck. This was nothing more than an alibi venture. Herman

Contrary to his instructions, he did not drive any further than Garmisch Partenkirchen. The equipment that was carried along, parts of the high-concentration plant, the paraffin and the uranium oxide were unloaded at Professor Kirchner's drop-off point. Rehbein, whose truck was also defective, unloaded fifteen to twenty crates of uranium oxide near the SS-Junkerschule in Bad Tölz.171 Another part of the uranium was taken to Kirchner's depot in Garmisch-Partenkirchen and was buried there.172 The radium was finally delivered buried in a lonely spot in the Isar valley.173 At the beginning of May 1945, Gerlach, Diebner and Heisenberg were captured one after the other. The head of the American nuclear project, General Groves, had no intention of releasing the German nuclear physicists immediately. They wanted to check whether they were still hiding important facts from the winners. The scientists were therefore completely shielded from the public.

When Kurt Diebner learned from the newspaper on June 9 that Thuringia would in future be part of the Soviet occupation zone, he was in despair.174 Immediately after the end of the war, his wife and Heinz Rackwitz drove back to Schloss Griesheim near Stadtilm.175 He begged his guards to bring his family to the American or British occupation areas. They noted about Diebner's condition: "During the next few days, Diebner showed signs of mental confusion and at first threatened to attempt an escape, and when he realized the impossibility of such a plan, he threatened suicide." 176

Marte Previti from the Alsos team was supposed to get Diebner's family out of Thuringia and bring them to the American zone, which he succeeded in doing.177 When Diebner received the notification that his family had been taken to Erich Bagge's parents in Neustadt near Coburg, he regained his composure. Little did he know that his wife would return to Thuringia a few days later. Heinz Rackwitz stayed at Griesheim Castle and set up a small storehouse there. It could hardly have been this camp alone that prompted the former General Secretary of the KWG to travel from Göttingen to Stadtilm shortly afterwards.178 Ernst

According to his own account, Telschow was concerned about the whereabouts of Diebner and his employees. However, he must have already found out about their flight to Bavaria and the subsequent arrest of Diebner. Furthermore, none of this group belonged to the staff of the KWG. So what was the real reason for his trip? In his diary, Telschow wrote about his unusual trip: "Only fragments of personal things discovered, some amazing, such as a salvaged jar of blackberry jam from the Harnack House!"179 Shortly thereafter, Telschow returned to Göttingen. Three years later he finally got what he must have been looking for in Stadtilm – research documents from the HWA.180

FIFTH PART

aftertaste

From Farm Hall to the Göttingen Declaration

Secret missions of the victors

After the German nuclear physicists had been tracked down, some employees of the Alsos Group were given a new job – they were looking for ignition experts.1

What the Alsos employees didn't know either: up until then, the scientists of the Manhattan Project had not succeeded in developing a suitable ignition mechanism for the atomic bomb.
As late as April 1945, a scientist who was involved in the development of the igniters had to state: "The probability that the igniters will not work properly is quite high."2 The solution to the problem was worked on until a few days before the first nuclear test.

It could therefore be useful to familiarize oneself with the scientific results of the defeated enemy. An Alsos search team even ventured deep into Soviet-occupied territory to track down a German detonator expert, who turned out to be a small fish. Alsos hoped to get better information from Dr. Rohnert, the director of Rheinmetall-Borsig.
With his help, a factory for the manufacture of electronically controlled bombs and complete electrostatic detonators was found.
An Alsos officer said: "The capture of Dr. Rohnert was very important for Alsos. Not least because a detonator developed under his direction can be used for the battle in the Pacific against the Japanese. I immediately returned to Washington from Paris with some of these detonators.«3

Interesting information fell into the hands of the Americans after the surrender of U-234 – a minelayer and one of the largest German submarines ever – on May 13, 1945. Numerous books were later written and films were made about its mysterious last voyage.4 The submarine was to carry around 210 tons of the most modern weapons, including the latest radar devices, anti-tank weapons, small rockets and even a jet aircraft dismantled into individual parts.

bring Me 262 vehicles to Japan. U-234 also had eight tons of construction documents and one ton of diplomatic mail on board.5 The experts carried the most important documents with them on microfilm. The most secret part of the cargo were ten extremely heavy steel drums. They contained 560 kilograms of uranium oxide. The dispute continues to this day as to whether it was ordinary uranium oxide, metallic uranium or even enriched material. The latter is unlikely.

Of all the U-234 cargo, the Americans seemed most interested in the infrared fuses. The so well ver

trusted expert was naval architect Dr. Ing. Heinz Schlicke.6 At the beginning of July he was asked to present his knowledge in several presentations to experts from the Navy Department. Months before his voyage in the U-234, he was sent by the scientific command staff of the Kriegsmarine "to all the experts who have something fundamental to say in the field of radio measurement technology or radio electronics in general."7 Schlicke also had a research report by Hans Klumb and Bernhard Koch from the Berlin-Gatow Air War Academy.8 This treatise on detonators was particularly insightful for the Americans. Whether the studies by German detonator experts were taken up by scientists from the Manhattan Project can only be assessed when the documents on the American nuclear project, which are still blocked, are released for historical research.

The Soviet Union was even more dependent on technological booty from Germany. While the Americans were nearing completion with their nuclear project, the Soviets at the time were short of practically everything, particularly uranium metal and uranium ore.

The taking of laboratory equipment and raw materials from Germany and the obligation of German scientists to work in the USSR were therefore of great benefit to the Soviet nuclear project.9 The main interest of the Soviet special forces was not Diebner's laboratory in Gottow – Diebner was not theirs until then known but also to the surprisingly intact facilities of the KWI for Physics in Berlin-Dahlem, the private laboratory of Gustav Hertz

Siemens. Ardenne did not hesitate and drafted a well-formulated statement to none other than Stalin. The letter ended as follows: "As of today, I place both my institutes and myself at the disposal of the Soviet government."

The documents of the KWI for Physics also fell into the hands of Soviet commandos. What they could glean from it was rather disappointing for the Soviet scientists. Nevertheless, at Laboratory No. 3 in Moscow, later known as the "Institute for Theoretical and Experimental Physics," an attempt was made to build a small heavy-water reactor based on Heisenberg's calculations and designs. It failed.11 Only years later was the attempt repeated with success.

The shortage of uranium ore was particularly precarious for the Soviet nuclear project. Kurchatov described the situation: "Until May 1945 there was no hope of building a uranium graphite reactor, since we only had seven tons of uranium oxide available instead of the necessary hundred tons, which we would only have had together in 1948."12 After the looting operation In Germany things were different: »In total, seven transports with 380 wagons were loaded and sent to the USSR. Together with the equipment of the physical institutes and the chemical-metallurgical companies, 39 German scientists, engineers and master craftsmen as well as 61 family members, a total of 99 Germans [sic!], were sent to the USSR [...] At various locations A total of 250-300 tons of uranium compounds were removed and seven tons of metallic uranium discovered.«13

At the beginning of May 1945, Kurchatov had sent one of his best employees, Georgij Flerov, to Germany away from the paths of the captured units. Under the seal of the strictest secrecy, he was to check whether the Germans had actually carried out nuclear tests shortly before the end of the war. On May 5 Flerov flew to Berlin and a few days later traveled to Dresden. As soon as he got there, he wrote to Kurchatov: 'Today or tomorrow we fly to the place you know. I take Dubowski's system with me, but the sensitivity doesn't seem to be particularly great. If it turns out on site that there are suitable research objects, but the problem is only

If the system is sensitive, I will wire it to you.«14 As a precaution, he commissioned two more employees to build an easily transportable measuring device. Flerov strictly adhered to secrecy, he did not reveal the destination of his journey.

But he had to be patient. Diplomatic preparations would have been necessary to fly to Thuringia, find the test area and take measurements there. In this respect, the announcement of the flight was premature. The Americans were still occupying Thuringia. By mid-May, the American withdrawal behind the agreed lines had not yet been settled. Only on June 11, 1945 did American President Truman agree to this.

Flerov meanwhile was stuck and on May 21 wrote a footnote to the letter to Kurchatov that had not yet been sent: »I still haven't managed to leave Dresden. If I discover on the spot that my stay is pointless, I'll let you know so that I can get permission to fly back to Moscow.'15 However, he was told to wait and had time to think about other ways he could carry out his task could solve. On May 29, he communicated his thoughts to Kurchatov.16 In the meantime, a migration of peoples had set in. Millions of former prisoners of war, forced laborers and expellees passed

through the demarcation lines and strove to return to their home countries. They were questioned at checkpoints. Flerov had looked at some of these checkpoints and spoken to former POWs. It was like looking for a needle in a haystack. This task was impossible to accomplish with just a few employees. He therefore suggested that in each filtration camp one or two men should search specifically for former prisoners who came from the vicinity of the suspected test area: "I think we could find what we need as a result of this search - a person which was in the vicinity of the test area at the time in question. There were many refugees in the woods at that time. In the best case, we get objective confirmation of the fact, as if we were there ourselves. However, this has to be done here on site and now.”17 He hadn't lost sight of the second way: “Um

To definitively determine what was tested there, we need to look for traces of man-made, not natural, radioactivity. Unfortunately, a lot of time has already passed, but I think that with our measuring instruments we can carry out the investigations with the necessary accuracy.«18

Flerov asked Kurchatov to send a well-equipped survey team. Unfortunately, the progress of events is not known. To date, the final part of the Flerov mission is unknown. We don't know whether he went to the test area with his people after the Americans withdrew from Thuringia in early July. Quite apart from that, with the measuring devices of the time, it would have been almost impossible to prove a core test around five months after the event. When American scientists tried something similar in Hiroshima in 1945, they had great problems proving an increased radioactive contamination. How would da Flerov manage to document an incomparably smaller nuclear event?

On July 16, 1945, the Americans successfully detonated their first plutonium bomb in the New Mexico desert. Stalin, already at the great conference of victors in Potsdam, learned about this from Beria's people. When Truman casually briefed him on the nuclear test during a conference break, he remained calm. In fact, he knew more about the American atomic bomb than the American President. His cool reply that he hoped the gun would help end the war was only a masquerade

Kurchatov felt confirmed in his strategy of imitating the American way. At the same time, the success of the Americans put him under pressure. In this situation, could he still deal with a small nuclear test in Germany? He was expected to build a bomb at least as large as the Americans already possessed. He had to focus his strength on that alone. Therefore Flerov was again ordered to Moscow at the beginning of August 1945.20

Farm Hall and Hiroshima

While the final technical problems in the construction of the atomic bomb were being solved in Los Alamos, German physicists still believed they were at the forefront of progress. What other reason, they suspected, did the Allies have for their internment. An official reason had not yet been given to them. British intelligence solved the problem by referring to martial law. This allowed prisoners to be held "at His Majesty's discretion" as "guests" for a maximum of six months.

On July 3, 1945, ten scientists were taken to Farm Hall, a country estate near the famous university town of Cambridge used by the British secret service: Bagge, Diebner, Gerlach, Hahn, Harteck, Heisenberg, Korsching, Laue, Wirtz and Weizsäcker.21 The house had been well prepared. Everyone got their own room. Despite all the prophecies of doom about British cuisine, the food was good. In his memoirs, Otto Hahn described the general conditions of internment: »Without exaggeration, one could describe our life in England as luxurious [...] No wonder that we all grew rapidly [...] For entertainment and education a pretty good library. In addition to the radio, we often listened to the Beethoven sonatas performed by Heisenberg on a piano. In the afternoons, Major Rittner sometimes read a few chapters from Dickens novels so that we could improve our English. After supper most continued to play bridge or skat over beer, which was available to us in any quantity.'22

There was practically nothing for the scientists to do at Farm Hall. Some started with theoretical work. Max von Laue wrote a "History of Physics", Carl Friedrich von Weizsäcker dealt with cosmological problems. They all took part in physics colloquia together, where they took turns presenting special topics. They also had plenty of time for discussions. That's exactly what the hosts were waiting for. The whole house was bugged, every conversation the Germans had was overheard and recorded. From the recordings, the British

Intelligence officers Major Rittner and Captain Brodie compiled 22 minutes of various lengths, which contain brief summaries of the mood as well as verbatim reports of individual, but by no means all, conversations.

It was only after almost fifty years that the listening protocols were released and published.23 Since then, the texts have been the subject of much discussion, with Werner Heisenberg generally being the focus of attention. They were considered by the historians of science to be the definitive proof of the failure of the German uranium project. However, overly far-reaching conclusions should not be drawn from the Farm Hall minutes. For one thing, only a fraction of the call recordings, around ten percent, survived. On the other hand, and this is far more important, the Germans suspected that they were being bugged. Therefore, they did not discuss the most sensitive topics in the house, but in the rose garden. "It was the right place for serious conversations for two," as Heisenberg later noted.24 Weizsäcker explained: "If there's something the English shouldn't hear, we go out into the garden."25 The Germans were aware that the winners had long since evaluated their documents. In this respect, they did not hold back when discussing technical details. Some of them just wished the British knew the details. They wanted to continue working on the uranium machine, which was only possible with the approval of the victors. In this respect, they were not frightened by the microphones.

Gerlach and Diebner found themselves in a special position. Only they knew how close a nuclear weapon had come in Germany. They had erased the traces of the tests as best they could and destroyed all important research documents.

From the beginning there were tensions in the group of internees. This was felt most clearly between Heisenberg, Wirtz and Weizsäcker on the one hand and Diebner and Bagge on the other. Although Gerlach had been in charge of the project since 1944, the others did not see him as the black sheep, but rather Diebner. He had worked the longest for the HWA and was considered loyal to the regime in their eyes.

In the technical discussions about nuclear fission, there was still

Werner Heisenberg set the tone. As usual, he was supported by Weizsäcker and Wirtz. Things were different for the "bomb faction," the scientists who more or less openly regretted the failure of the uranium project. These included Gerlach, Diebner, Bagge and Harteck. The British could not make sense of Gerlach's behavior. They appreciated his friendly nature, but suspected him of having connections with the Gestapo. They had no evidence of that. 'As the man appointed by the German government to organize the uranium research work, he sees himself in the position of a defeated general; when the news [of the American use of the atomic bomb on August 6] came, he was apparently contemplating suicide.«26 Diebner was judged very negatively: »Outwardly very friendly, unpleasant personality who cannot be trusted.«27 Die Discussions between the scientists primarily revolved around the fate of their families, the future of Germany and their future job opportunities. Bagge and Diebner seemed to suffer most from the uncertain fate of their relatives. Questions about personal attitudes towards National Socialism were repeatedly discussed. Gerlach attached great importance to his distance from the regime. That struck Bagge as odd. Diebner tried to justify his NSDAP membership.28

The news of the first American atomic bomb being dropped on Hiroshima on August 6, 1945 caught the interned scientists completely unprepared. For her it was a shock. Their reactions varied greatly. Only Laue and Hahn were somewhat relieved that they had lost the race. For everyone else, disappointment prevailed. Heisenberg did not want to believe the report at first and spoke of a newspaper canard. He must have realized that he had lost his supposed top international position in research into atomic energy, and had never had it. Gerlach guessed it was a plutonium bomb, although he was talking about element 93. Diebner interjected a revealing remark: "We always thought it would take us two years to make a bo

was an indirect criticism of Heisenberg, who had not succeeded in five and a half years. Weizsäcker indicated the further direction of the discussion: »I think it's terrible of the Americans to have done that. I mean, it's madness." Heisenberg contradicted him: "You can't say that. It's the fastest way to end the war." Hahn teased Heisenberg and addressed the problem of critical mass: "Why did you always tell me that you need fifty kilograms to make something? Now you say you need two tons.«30 Heisenberg did not want to commit himself immediately, but then calculated the critical mass correctly over the next few days.

The discussions revolved mainly around the method by which the Americans U235 had won. All the shortcomings of the Uranium Association became apparent once again. Weizsäcker said that isotope separation was deliberately neglected in Germany. Harteck pointed out that he had insufficient financial and human resources at his disposal. Korsching took these statements as an opportunity to criticize the management of the German uranium project.
That was the last straw. Gerlach yelled at his younger colleague and forbade his instructions.

Harteck tried to calm things down. If they had progressed with their research, the victors would have killed them all: "We should be glad we're still alive. Let's celebrate the evening in spirit." Diebner contributed a subtle comment: "Professor Gerlach would have become SS Obergruppenfuhrer and is now sitting in Luxembourg as a war criminal."31 Why SS Obergruppenfuhrer? Did Diebner allude to their cooperation with the SS in Thuringia and Kammler?

Gerlach had enough of the discussion and left the room. He felt like a defeated commander. In a figurative sense, he actually was. He and Diebner were the only ones who knew the real state of German research. You were responsible for the tests in Thuringia. No one else around knew about it. At the same time, the thought must have crossed their minds about the catastrophe a German use of nuclear weapons would have brought about. Gerlach had good in the

During the sixteen months in which he was at the forefront of nuclear physics research in Germany, he tried everything to be successful and also to save as many institutes and scientists as possible. Developments had been blocked or slowed down before, not under his direction. In particular, Diebner and Harteck broke a lance for him.
They knew they would have made it with a man like Gerlach at the helm if he had been appointed a year or two earlier.

In addition to anger, Gerlach was moved by another emotion – fear. He indicated to Otto Hahn that after his return to Germany he could be considered "ready for a warwolf."32 Of course, Gerlach had not forgotten that he and Diebner were to be arrested or even killed in the final days of the war. Could it be ruled out that former SS members saw him as a traitor? A "wonder weapon" was finally developed under his direction, but was no longer used.
There was hardly any better material for a new stab-in-the-back legend.

Gerlach had already worked out his own legend. He only took on the post of Commissioner for Nuclear Physics to save the physics institutes and their employees from the war. His cover-up tactics were reflected in a discussion with Otto Hahn: "I never thought of a bomb for a moment, but I said to myself: 'If Hahn made this discovery, then at least we want to be the first to make use of it. '"33 How is that to be understood? Did he want the bomb or not? Yes, Gerlach wanted the bomb, but no longer as a means of warfare, but as a possible bargaining chip for negotiations with the Allies. At least that is how one can interpret his behavior in the last months of the war, which oscillated between euphoria, depression and fear. From the great organizer of the fusion bomb concept, he had become the driven man of the SS leadership. Gerlach said untruthfully to Hahn: "We never worked on the bomb."

was afraid to think the bomb, but I imagined it as a thing of the future; whoever could threaten to use the bomb could achieve anything. That's exactly what I told Geist, Sauckel and Murr.'34 But how did Gerlach want to negotiate with the Allies about a 'matter of the future'? Wasn't it rather that the "thing" had already been successfully tested? He could not have frightened the Allies with a reactor.

By the next day, everyone had regained their composure. They reminded each other that nuclear fission had been discovered in Germany and still believed they had made more progress with their reactor experiments than the Americans. Weizsäcker provided an explanation for the failure of the Heisenberg group: "I think we didn't succeed because basically all the physicists didn't want it to succeed. If we had all wanted Germany to win the war, we could have succeeded." Hahn contradicted him: "I don't think so, but I'm grateful that we didn't succeed." Weizsäcker insisted: "Rather, we had to we admit that we didn't want things to work out at all.' And later: 'Our strength now is the fact that we are 'non-Nazis'.'35 Weizsäcker's view was not shared by everyone. Erich Bagge thought it absurd to claim that they hadn't wanted to.

However, the prospect of claiming moral superiority was too tempting. Weizsäcker and Heisenberg formulated a press release on August 8 at the request of the British officer in charge, Major Rittner. In it they referred to the fact that nuclear fission was discovered by Hahn and Strassmann in Germany and was the result of pure basic research. The production of a bomb had been assessed by them as technically not feasible. Instead, the German Uranium Association concentrated on the development of a uranium machine and made significant progress in the process. The memorandum gave the impression that no research into nuclear weapons had been carried out in Germany. All efforts were directed only to the development of a reactor. Not all scholars agreed with the text. Thief - the best about the true goals

of German uranium research - and Bagge expressed her displeasure, but ultimately signed it anyway.36 The memorandum of August 8, 1945 was never published, but was nevertheless intended to establish the myth of the German uranium machine.37 A few months later, the British and the American government in a text that has also never been published almost verbatim some key sentences from the paper of the German scientists.38

In the autumn of 1945, the British and Americans discussed at the highest level what should be done with the interned German scientists.39 Could they simply be sent back to their hometowns? In this case, the Allies feared Soviet recruitment or even kidnapping. General Groves was most concerned about this possibility. He proposed a drastic solution to the problem to the British. The Germans should be prosecuted as war criminals.40 When the British government refused, Groves pushed for the scientists to get jobs in Britain.

The internees had become the pawn of the victors. They were no longer needed. In view of the Soviet efforts to launch a nuclear program as well, the German scientists only posed a security risk. The British ultimately saw no further possibility of detaining »Her Majesty's Guests«.41 In mid-November 1945, further action was decided between the British Prime Minister and the American government discussed. The question of the repatriation of the German scientists was made even more explosive by the forthcoming award of the Nobel Prize in Chemistry to Otto Hahn. He had been invited to the award ceremony in Stockholm by the Nobel Prize Committee. However, the British Foreign Office saw no reason to make special arrangements for Hahn and did not allow him to take part in the ceremony scientists have been reiterated.

It said: "Their efforts did not go beyond the stage of laboratory experiments and were directed exclusively to the use of atomic energy as a source of energy."43 This was obvious.

Here is a verbatim quote from the memorandum of August 8, 1945 written by Weizsäcker and Heisenberg. Strictly speaking, nothing wrong was said in the government statement, which was never published. The text only referred to the Uranium Association.

In January 1946, the German scientists were allowed to return to their homeland.

post-war careers

The military officer responsible for preparing and conducting the tests in Thuringia was Hans Kammler. One would have thought that the victors would have done everything possible to find and bring him to justice as one of the main people responsible for the criminal enterprise Dora-Mittelbau concentration camp and the countless deaths in the many other underground relocations. That didn't happen.

A last documented sign of life was dated April 23, 1945.44 Kammler then fled first to Ebensee (Austria), where he met SS leaders, and then to Prague.

To the chief SS journalist, Gunter d'Alquen, Kammler prophesied "that we will still experience something in Prague."45 He is said to have died there on May 5, 1945.46 Over time there were always new versions, but of these not a single one was true. The only thing that is certain is that Kammler's track was lost in Bohemia in the last days of the war. A Czech government commission was unable to confirm any of the death versions in the 1960s.

The American secret service assumed that Kammler managed to go into hiding in Austria. In 1947, the Americans suspected that the Soviets were secretly negotiating with him about handing over valuable documents and design data.47 However , they had no concrete evidence for this suspicion. A handwritten statement from a confidant of Kammler from the post-war period points to the "Austrian trace".48 He claims that he last saw his former superior in 1968. Be that as it may, the fate of one of the most powerful men in the Third Reich has not been clarified to this day.

the. Inevitably, therefore, its role in the attempts to build a "miracle weapon" remained in the dark.

Albert Speer was not at all in the dark. He was one of the main defendants in the Nuremberg trials. Five days before the court's opening session, Speer, through an American intelligence officer, approached the United States' chief prosecutor, Robert H. Jackson. He indicated that in court he might be forced to reveal some military details that would be useful to the Soviet side.49 Jackson ignored Speer's requests. Nevertheless, his willingness to cooperate and his appearance in court made an impression. In contrast to the other former Nazi greats, Speer acknowledged his complicity in the catastrophe: "Insofar as Hitler gave me orders and I carried them out, I am responsible for them, but I did not carry out all the orders."50 In his closing remarks Speer also spoke before the Nuremberg tribunal about the dangers of a coming war: »In five to ten years, war technology will make it possible to launch rockets from continent to continent with uncanny precision. It can destroy a million people in the center of New York in seconds by destroying the atom with a rocket, operated by perhaps only ten people, invisible, without prior notice, faster than sound, day and night. (...) This process must therefore make a contribution to preventing degenerate wars in the future and laying down the basic rules of human coexistence.«51

Speer was sentenced to twenty years in prison, which he served in Spandau. His memoirs and other books later reached enormous editions. In it he formally acknowledged his guilt, but was careful not to be directly associated with the crimes of the regime. He claims to have “sensed” something about the murder of the European Jews, but really “knew” nothing.52 Speer maintained this line of argumentation until his death in 1981.

Why was he silent, who had dealt with the past more critically than anyone else in the leadership of the Nazi state?

to the tests in Thuringia? For the same reasons as everyone else. He should have admitted his undying hope for victory and his acquaintance with the killing of the prisoners, thereby calling into question all of his previous arguments.

The path of Erich Schumann, the former head of the research department at the HWA, was different in every respect. He went into hiding for almost two years because, as he later admitted, "both the eastern and western occupying powers had an increased interest in getting hold of me." immediately sought lenient treatment from the British occupation authorities and wanted to enable him to return to science.54 Schumann then reported to the British in July 1947, who placed him under their protection, questioned him for a few days and left in August 1947 released from their care.55 Schumann's hopes of finding a job at a university fell through.56 He moved to Hamburg and in 1949 became head of the Helmholtz Institute for Sound Psychology and Medical Acoustics.

In mid-1947, Schumann had former employees recapitulate the most important parts of their secret patents, which had been destroyed at the end of the war, and summarized this in an eighty-page research report:57 »After compiling this report, there was almost no longer any doubt that due to the methods developed from the knowledge gained during the war would almost certainly lead to the goal. A small experiment, which may be explained elsewhere, produced a positive result in the laboratory.«58 The results of the HWA's fusion research were presented in the secret patents and Schumann's report. Schumann was of course aware of what this meant. With their "x-ignition" configuration, the HWA scientists had found a way to trigger thermonuclear reactions.

Schumann wanted to see the claims to their inventions protected. He discussed the problem with Ernst Telschow, the former General Secretary of the MPG.59 Telschow pointed out that registering secret patents under occupation conditions

is not possible. The report first disappeared in Telschow's safe and was handed over to the British a little later. Apparently they couldn't do much with it.
Only later did they realize how explosive it was. If one believes the oral reports from former British officers, then soon after the end of the war they found out that there were other research groups in Germany besides the Uranium Association that dealt with questions of nuclear physics. These largely unknown groups, and not the Uranium Association, have succeeded in developing tactical nuclear weapons with comparatively modest resources.

Schumann was willing to disclose the real status of the HWA's research work and had been preparing a publication since the autumn of 1948.60 He wanted to secure scientific priority for himself and his employees, countering accusations from colleagues61 that he was in favor of failure of the uranium association the main person responsible, and last but not least to improve his income. The Cold War suited Schumann's concerns. In August 1949, the Soviet Union, surprising many Western observers, tested its first atomic bomb. Schumann thought he could offer an explanation for this – in his opinion, Soviet physicists had chosen the German way of building a nuclear weapon. This was a fallacy, as it turned out later. In any case, Schumann no longer saw any reason to withhold his knowledge from the public. Colleagues and friends taught him otherwise and urgently advised him not to publish it.62 With the book, the publisher and author would be violating the Control Council laws that prohibited German scientists from doing any nuclear physics work with military relevance.63 In short, Schumann drew the manuscript return.

Now, together with Hans Winkhaus, Walter Trinks and a few other close associates, he concentrated on exploiting their secret patents, which was complicated given the current Control Council regulations. The group's patent claims concerned four problem areas: methods and devices for generating extremely high pressures and temperatures, synthetic manufacture of diamonds, atomic nuclear reactions and atomic

Shaped charges.64 They were the product of years of work by about a hundred scientists, including some of the world's leading experts on shaped charges. The patent attorney Karl Heinz Vogt recognized the value of the group's drafts and bought into the patent exploitation with a hundred thousand marks, an extraordinarily high sum for the time.

Since in the Federal Republic of Germany until May 1955 the topics dealt with by the employees of the HWA were subject to sanctions by the control council, the group tried in vain to come to contracts with interested parties from the Spanish Academy of Sciences and the American Dupont group.65 After that They sought the support of the President of the German Patent Office and later also of the Federal Ministry of Defense and now wished that their inventions should only be used by German authorities it had to come - one parted in a quarrel. Winkhaus and shortly afterwards Schumann withdrew from the group.67 Erich Schumann died in April 1985.

The patent exploitation failed due to the circumstances of the time. Until May 1955, secret military patents could not be registered. When this became possible, the Americans and Soviets had developed similar methods for detonating thermonuclear bombs and were not dependent on German know-how.

One of Schumann's best associates, Walter Trinks, was taken prisoner by the Americans in 1945. After his release, he took a job at the Oerlikon company in Zurich. From 1950 he worked in industry in Sweden. His return to Germany was prepared by Schumann. He helped to ensure that Trinks got a job in the Federal Ministry of Defense.68 There, in February 1958, Trinks took over the department for physics of explosives, which he headed until his retirement in 1975.69 He continued to deal with shaped charge research and protection against nuclear weapons and filed numerous patents.

One of Trinks' best employees, Werner Schwietzke, went to Australia in 1945.70 There he worked on the Australian nuclear project, which was stopped by the Australian government before it was completed.71

After Wilhelm Ohnesorge had made passionate speeches in March 1945 and talked about imminent victory, he fled to Austria in mid-April. A few weeks earlier he had ordered the relocation or destruction of all secret files. When Soviet troops took over the Reichspost headquarters in Berlin, they found the minister's safe empty. They did not find any important documents in his temporary quarters in Bad Saarow either.

On May 11, 1945, Ohnesorge was arrested by American troops in Bad Gastein. In the spring of 1947 he found himself in the dock in Nuremberg. In particular, his connections to the SS were the subject of the hearing. Crimes could not be proved against him. He was acquitted.72 Later the Appeal Chamber for Upper Bavaria in Munich classified him as the »principal culprit«. The confiscation of his assets and the loss of pension entitlements were serious for Ohnesorge. In a retrial in 1955, the verdicts of the tribunals were overturned and the proceedings were discontinued. Wilhelm Ohnesorge died on February 1, 1962. The role of the Reichspost in nuclear research went largely unnoticed.

Peter A. Thiessen, who had flirted with the “Russian card” as early as 1944, went to the Soviet Union in autumn 1945.73 He headed a research group there that dealt with isotope separation. In 1956 he returned to the GDR and became director of the Institute for Physical Chemistry. From 1957 to 1965 he also headed the Research Council of the GDR. Thiessen received numerous state awards and once again managed to play a central role as a science manager.

At the end of the war, his former employee Georg Graue refused to work in the Soviet Union.74

The secret service then put him in the Ketschendorf camp. Gray was lucky and survived. He was released in 1948, went to West Germany, took a job at the Clausthal Bergakademie and later became chief chemist at Phoenix-Rheinrohr AG. He kept loose contact with his former boss after his return from the Soviet Union. He no longer played any role in nuclear energy research or policy.

Things were very different with Walther Gerlach. He remained one of the central figures in science policy. After his release from British internment, he taught from 1946 to 1948 as a visiting professor at the University of Bonn. In the spring of 1947, with the support of the British occupation authorities, Gerlach founded an "Emergency Society for German Science" for North Rhine-Westphalia. It should serve as a forerunner for a later national organization. At the beginning of 1948 he was able to work again as a full professor at the University of Munich. There he also served as rector of the university until 1951.

After 1948, Gerlach grew into the role of a doyen of physics and science management: from 1949 to 1951 he was elected vice president of the »Notgemeinschaft der Deutschen Wissenschaft« and from 1951 to 1961 vice president of the German Research Foundation.75 In these functions he belonged to the sponsors of nuclear energy in the Federal Republic. Gerlach was at the forefront in terms of public resonance and scientific prestige; he became one of the pioneers of the media presentation of science and also made a name for himself as a historian of science. His creative power was unbroken. He wrote dozens of books and articles and also found the time for extraordinarily intensive correspondence.76

We do not know whether Gerlach was still in contact with Colonel Geist. The colonel was better informed than almost anyone else about the latest state of German weapons development. Shortly before the end of the war, his wife had begged him to say if and when Hitler would use the "miracle weapon." Friedrich Geist said no. For a while there was some hope of an atomic bomb, but

Scientists would have failed Germany.77 After his capture, Geist was interrogated by Americans and British in the Kransberg camp. They were not particularly impressed by his statements.78 Geist supported the thesis of the "West's stab in the back" against the German Reich. He saw Germany at the forefront of a defensive struggle against Bolshevism.79 Geist was only asked two brief questions about the state of nuclear research. He then stated that his office had no precise knowledge of Allied nuclear research. It was left at that.
In the 1950s, Friedrich Geist worked as a consultant for large companies and the Federal Ministry of Economics and also played an important role in setting up the Bundeswehr.80 He died in 1958.

What became of the other scientists? Most of them were able to continue their careers almost without interruption. A friendly relationship remained between Gerlach and Diebner throughout their lives. Otto Haxel was repeatedly offered a chair in Munich by Gerlach, and he even offered him his successor. But he refused. Haxel accepted a professorship at the University of Heidelberg. In contrast to Diebner, he pursued a career in university research and was also present in the most important committees of German nuclear policy.81 He publicly celebrated nuclear energy as a "gift from heaven" and, on the other hand, did not shy away from pointing out the military importance of nuclear power plants . "Every uranium power plant" is inevitably also a "nuclear explosives factory": "In times of crisis or even during war, no government will let the gain in military power through the plutonium produced go unnoticed."82 There were secret irritations. In the spring of 1953, at the instigation of the Americans, Haxel was released from working on a secret project.83 One can only speculate about the background.

An answer to this may be found in American documents, which are still blocked. From 1970 to 1975 he was managing director of the nuclear research center in Karlsruhe. In 1971 he received the Federal Cross of Merit for his scientific life's work.

While Haxel, like Heisenberg and Wirtz, played an outstanding role in establishing the nuclear energy industry in the Federal Republic, other scientists went to the USA. These included the flow researchers Gottfried Guderley and Adolf Busemann, the explosives expert at the Naval Weapons Office Erich Buchmann and the physicists Paul Harteck and Hans Bomke. Buchmann joined an American naval research department in Carderock, Maryland, and headed a research group there that dealt with underwater explosions.84 In Germany he had already developed a method for filming the explosions and their effects underwater. He continued this project.

After his release from Farm Hall, Paul Harteck returned to his institute in Hamburg in January 1946. Two years later he became rector of Hamburg University and held office until 1950. Thanks to his professional competence and loyalty to the British occupation authorities, he enjoyed their trust. Shortly after his return, the occupation authorities allowed him to continue his experiments with an ultracentrifuge.85 The components for this were brought together from Celle, Kiel, Eutin and Hamburg. The British occupation authorities deliberately refrained from issuing written instructions. They knew that restarting the ultracentrifuge was a clear violation of Allied Control Council regulations. Harteck's work was funded by the UK Department of Atomic Energy.
This may be the reason his files are still blocked in the UK to this day.

In early 1951, Paul Harteck was offered a professorship at the renowned Rensselear Polytechnical Institute in Troy, New York State. Since then he has taught physics there. The centrifuge technology, which he was instrumental in initiating, was used in all countries with a developed nuclear industry.

Reference has already been made to the scientists who were brought to the Soviet Union in 1945/46 and worked there until the mid-1950s. There was also a large, about seventy

A group of explosives experts led by Hubert Schardin, comprising scientists and engineers, who received contracts from the French government as early as 1945. A research institute was set up specifically for this group in Saint-Louis in Alsace, which was subordinate to the French Ministry of Defence. In 1946 Schardin organized three scientific conferences in his institute, including one on questions of nuclear physics.86

The »black sheep«

After Kurt Diebner was released from English internment in March 1946, his existence was in tatters. Resuming an academic career was hardly an option. He had been in the HWA uniform for too long.
In addition, not a few of his colleagues saw him as the sole culprit for the work, some probably also for the failure of the uranium association. It wasn't true, but it made her get over her own part more easily.

Necessity is the mother of invention, and so Diebner founded a company in Hamburg to develop electronic measuring devices. In 1948 Durag Apparate GmbH emerged. Their best-known product was the twilight switch, for which Diebner had applied for a patent. When Hamburg converted the street lighting to a twilight switch, the economic hardship in the Diebner household finally came to an end. Without a large loan from the Hamburg businessman Schaumann, he would soon have had to file for bankruptcy.87 Gerlach, who was on friendly terms with Diebner until his early death, also supported the company with money and recommendations.88 Diebner thanked him in September 1950 : "It's bad enough, but I hope to make it."89 He made it, but he couldn't get away from nuclear physics. Diebner caused quite a stir in 1949 on the occasion of a specialist lecture. He gave a lecture on the state of nuclear research in the Soviet Union and got carried away with the thesis that Stalin already had hydrogen bombs.90 He probably based his statement on the assumption that part of the knowledge came fro

had been passed on to their Russian colleagues by the scientists now working in the Soviet Union. In fact, Berkei, Czulius, Thiessen, Pose, Rexer, Witzell and other scientists and military officials had been questioned by the NKVD about their experiences in nuclear research.

The Allies were not enthusiastic about Diebner's public speculation. They reacted with sharp criticism to his performance. Diebner held back with such statements in the future. Things were different in Moscow. Until the end of the war little was known about his work in Gottow. Therefore, neither he nor any of his employees appeared on a "wish list"

von Kurchatov.91 By the end of 1945, the Soviet secret service had obtained more precise information about the structure and the key people in the German nuclear project. This is confirmed by a report by the NKVD Major General VA Kravcenko: »In 1939 the research department of the Army Weapons Office (Prof. Schumann) established a special group for studying the possibilities of using intraatomic energy for military purposes, which was headed by Dr. thief stood. For this purpose, a nuclear physics laboratory was set up at the Kummersdorf military training area. The staff consisted of young scientists – physicists and electricians. From that time onwards, the organizational unification of all German scientists working on questions of nuclear physics began. In this way, in the research

– „who were members of the NSDAP.

department of the Army Weapons Office in the group of Dr. Diebner gradually took on the organization and management of all work in Germany in the field of nuclear physics, with the laboratory in Kummersdorf taking on coordination and control functions. [...] The well-known German scientist Prof. Gerlach, who since 1943 combined all work on nuclear physics in Germany, including the military laboratory in Kummersdorf, was appointed as Göring's official special representative, with the actual organizer of all work being Doctor Diebner.« 92

So the Russians knew what Diebner had done. It is possible that his lecture was the final impetus to make him a lucrative offer for a job in the Soviet Union in 1950.93

He probably didn't seriously consider it. His company was now out of the woods. He could hope for a comparatively modest but secure life in the Federal Republic.

In early 1952, Diebner received an offer from the USA, perhaps also as a reaction to the Soviet activities. He was on a list of around 100 German scientists who had received offers from American companies and government agencies to work in America. He was promised an annual salary of $9,500. That was a lot for the time. Diebner was undecided and asked Gerlach: "Should one accept such an offer or not?"94 He had already filled out the American questionnaire and given Gerlach as a reference. Gerlach answered immediately: 'You are now asking me about the action taken by the Americans. I know these. I too was recently made an immediate offer, even for a permanent position. I turned it down myself. It is extraordinarily difficult to give advice here, because one has the feeling that with advice one is also assuming responsibility [...] I would not do it.«95 At the end of the letter follows a key sentence: »You must not believe that I have forgotten our joint work and the beautiful, albeit exciting, hours in Thuringia.«96 What was supposed to have been so exciting in Thuringia? In this allusion, Gerlach is not referring to the beautiful landscape, he is referring to the tests. For him and Diebner, this was an extraordinary scientific success, about which they had apparently agreed not to disclose anything.

In the early 1950s, Diebner briefly held a teaching position at the State School of Ship Engineering in Flensburg.97 He received impetus for new activities from his long-time acquaintance Erich Bagge, who was now working at the MPI for Physics in Göttingen. Bagge wanted to get involved in building nuclear reactors for ships. In May 1955, shortly after the Allied research bans in the field of nuclear physics were lifted, Diebner suggested founding a »Hamburg Nuclear Energy Group«. Just under a year later, the Society for Nuclear Energy Utilization in Shipbuilding and Shipping (GKSS) was founded. The Geesthacht Research Center later emerged from this company.

To a certain extent accompanying the formation of the GKSS, Diebner was active as editor of the magazines »Atomic Nuclear Energy« and »Nuclear Technology«. In addition, using the name of his Durag business partner, Werner Tautorus, he published a list of the secret works of the Uranium Association and other works on the history of nuclear fission.98 He was concerned with doing justice to the achievements of German physicists, not least his own research group to set light. He continued to write some of his articles under pseudonyms because, in his own words, he feared being discriminated against by representatives of the “Heisenberg clan”.

Diebner was a versatile person. Most amazing was his busy work as a patent applicant. Usually he was the source of the ideas, while Bagge used the possibilities of his university laboratory to test the inventions. His young colleague Friedwardt Winterberg was also involved in individual inventions.99 In addition to those named, members of the Diebner family, employees of Durag and other people acted as patent applicants. 90 percent of the proceeds from the patents were shared between Bagge and Diebner. Engineer Schlottau, who had worked in Diebner's team, also received a ten percent share of the proceeds.

The patent applications were concentrated in three areas: technical apparatus, nuclear reactors and nuclear fusion processes.100 It all began with the development of measuring devices. Reactor patents could only be submitted after the Allied research bans had been lifted from May 1955. The eighteen patents by Diebner and Bagge on reactor technology cover several hundred pages. One wonders how it was possible for two scientists to file so many patent specifications immediately after the research ban came down. They must have been working on this for a long time.

Diebner drew on the experience from Gottow. His final experimental setup may have been what he called in the 1955 patent a "two-stage nuclear reactor" designed to breed plutonium. Several large companies that wanted to get into nuclear technology showed interest. Finally, the Babcock and Wilcox firms acquired two reactor patents in the 1960s.101

Of particular interest are two withdrawn patent applications by Diebner and Winterberg on “Methods for igniting thermonuclear reactions by means of convergent detonation compression shocks” and on a “Method for electromagnetic igniting thermonuclear nuclear fuels.”102 The claim of the first patent states that the method is suitable for "Ignition of thermonuclear nuclear fuels" that are suitable for explosives and for "ballistic charges, especially small hydrogen bombs, as well as for industrial purposes."103 Apparently, Diebner and Winterberg had pushed too far with these patent applications. They must have realized this soon, and so they withdrew the patent specifications. Further patent applications in the field of nuclear fusion followed in 1961, but now with clearly civilian benefits.104

reasons for the silence

Only a very small group of people knew about the concrete background of the nuclear weapons tests in Germany and the secrets of the construction of the bomb. These most likely included Gerlach, Haxel and Diebner and some of their employees. None of them later mentioned the tests in Thuringia to third parties.

The scientists had good reasons for their silence. During the test on March 3, 1945, several hundred prisoners of war and concentration camp inmates lost their lives. We do not know who was responsible for this. In any case, Kammler had the traces removed and the dead burned.

Gerlach and Diebner were obviously afraid that they would be charged as war criminals. Ohrdruf – this place name also symbolized the crimes of the Nazi regime. The Ohrdruf concentration camp was one of the first camps to be liberated by American troops. Even hardened American front-line soldiers could not put their impressions of this place into words. The documentary film commissioned by General Eisenhower about the Ohrdruf camp went around the world, as did a report by a British MP

delegation made sure that the crimes committed in Ohrdruf became internationally known.

It must be remembered that not only the concentration camps, but also the military training area at Ohrdruf, where the tests had taken place, were under the control of the SS from October 1944. It was Himmler and Kammler who wanted to seize the research results of the rocket engineers and nuclear physicists in order to build a "wonder weapon". Regardless of how far these efforts went, the mere fact of having worked on a project under the auspices of the SS was more than a blemish for everyone involved.

When Heisenberg and others in the early post-war years tried to defend themselves against Samuel Goudsmit's accusations that German nuclear physicists were incompetent and, in the interests of self-justification, painted a picture of their "apolitical" research directed only at a uranium machine, this provoked emotional reactions among American scientists. Under the impression of the revelations of the Nuremberg war crimes trials, the physicist Philip Morrison accused the German physicists of wanting to produce an atomic bomb and of having worked for the »Himler cause and for Auschwitz«.105 Heisenberg could not sit down with that to let. He pointed out that the Americans had planted the bomb and, on top of that, argued that Germany's failure to make any major advances was a result of his moral scruples.

Nevertheless, Samuel Goudsmit's Alsos book, published in 1947, had an opinion-forming effect in the USA. After that, Heisenberg and Weizsäcker in particular were considered dubious scientists. They have been accused of fundamental scientific errors, and their moral integrity has also been called into question. The American historian Mark Walker aptly wrote: »Goud smit gave a blatantly distorted picture of German scientific achievements. His arguments consisted of an often randomly hodgepodge of factual information, extraneous material, and unprovable anecdotes. Apparently he had not carefully read the confiscated reports dealing with nuclear power."[106]

Heisenberg responded to Goudsmit's criticism with an essay in the journal Die Naturwissenschaften, in which he tried to put the achievements of German scientists in a better light 107 Both continued to argue for a while and then broke off their correspondence.

In view of the controversy between Goudsmit and Heisenberg, Gerlach, Diebner and their accomplices must have felt encouraged in their silence. They had progressed further than Heisenberg and had worked intensively on the development and testing of atomic bombs. Admitting this would have been tantamount to self-accusation. However, they had to accept that the scientific achievements of Schumann, Esau and Diebner were completely underestimated. These had held high offices in the Nazi state and were now considered black sheep. Against these scapegoats, all other physicists could claim to have been distant from the regime. Technical competence in the Nazi state seemed to have been linked exclusively to non-political behavior and vice versa.108

Hiroshima and Nagasaki added additional reasons for the silence in Germany. After the American atomic bombs were dropped, the international public became aware of the extent of the devastation caused by atomic weapons. The horrifying images triggered a deep moral crisis among the scientists involved in the Manhattan Project. Hundreds of physicists quit their jobs at Los Alamos.

Finally, one should also consider the division of Germany and the beginning of the Cold War. This can be shown using the example of Diebner's deputy, Friedrich Berkei. Shortly after the Soviet army moved into Thuringia in early July 1945 as agreed, Berkei and Hartwig were interrogated by NKVD officers. Berkei was taken to Moscow for a few weeks and questioned. He was then allowed to return to Germany.109 His quick release suggests that the Soviets did not see him as a key figure. In their reports, Berkei and Hartwig only dealt with the well-known Gottow reactor experiments.110

Berkei led a nondescript life after that. He moved to Stadtilm with his wife and founded Bruno with his father-in-law

Seeger a lamp factory.111 Ironically, the company Seeger &. Co. for lighting needs in premises adjacent to what Berkei used to work in the middle school. The small company initially did well.

Hardly anyone in Berkei's environment knew that he had played an important role in Diebner's research group during the war. Politically he held back completely. Only after his father-in-law and brother-in-law fled to West Berlin in 1953 did Berkei become a target of the State Security. He must have suspected that he was being tracked down. But he was drawn back to Gottow several times. There he visited the families of former employees of the test center.

In the meantime, the employees of the State Security in Arnstadt had heard rumors that Berkei had been involved in nuclear tests during the war.112 Over the next few years, the Stasi officers tried, with little success, to obtain further details about his activities in the Nazi time to experience.
In 1965, a brief exchange of letters between Berkei and the British historian David Irving got her excited. Irving was working on a book on German nuclear research and wanted details of Berkei's activities in Gottow and Stadt im. In this context, he also asked for his scientific diary to be sent to him. Surprisingly, Berkei agreed to this request. His wartime diary was with relatives in West Berlin. They were supposed to mail it to Stadt ilm, but the valuable notes never got there.

Irving got nothing. The diary has been lost to this day.

When researching the alternative quarters of the Diebner group, employees of the district office of the MfS in Arnstadt came across the names of several craftsmen who had worked there in the last months of the war. Two of them, Karl Kaufmann and Erich Rundnagel, still lived in Stadtilm. At the beginning of July 1966, master plumber Erich Rundnagel was questioned.113 What he had to say sounded so unbelievable that the Stasi officers remained sceptical. However, they did not immediately file the report, but carried out further investigations.114 They examined the basement of the Stadtilm school and discovered it there

the well mentioned above. They also found some lead plates on the property of the Seeger family. Members of the air protection carried out radiation measurements. A slightly increased radioactivity was detected in some places in the well.

Berkei could no longer be interrogated by the MfS. He fell seriously ill in early 1966 and died in September at the age of just 55. MfS officers examined the case and thought they had found an explanation for the death. A blood test revealed that he died as a result of radiation sickness.115 The Stasi saw no further reason to pursue the history of the »Stadtilm Research

Center« any further. The main characters had died or lived in the Federal Republic, and the radiation measurements had yielded no alarming results. The file was closed on May 6, 1968.116 The head of the MfS district office in Arnstadt had no idea how close his employees got to one of the greatest secrets of the Third Reich

men were.

Controversy over the Göttingen Declaration

In October 1956, the aspiring nuclear minister Franz Josef Strauss became defense minister. It was a turbulent time in terms of foreign policy. Only a few days after he was sworn in, a popular uprising broke out in Hungary, which was finally crushed by Soviet troops in November. At the same time, the British-French-Israeli attack on Egypt kept the world in suspense. The Soviet Union threatened to use nuclear weapons against Paris and London if both powers did not end the Suez Canal war. The strategy of massive nuclear retaliation was discussed in the USA at the time. Even a delivery of tactical nuclear weapons to the armies of the allies - even to the Bundeswehr – was considered.117 Control over the warheads, however, should lie exclusively with the Americans. When these plans became known, one of the biggest political disputes of the entire Adenauer era ensued. Already

Years earlier, Heisenberg and Weizsäcker in particular had insisted that the Federal Republic should restrict itself strictly to the peaceful use of nuclear energy.

When the defense minister's plans for nuclear rearmament became known at the end of 1956, thirteen German physicists wrote a letter to him and to Atomic Minister Balke. They rejected the plans. Strauss assured that a national nuclear armament was not planned. The Bundeswehr should only receive a nuclear component within the framework of NATO and under American responsibility. As a young soldier, Strauss first heard of the possibility of building an atomic bomb in the summer of 1941. His teacher Walter Otto referred to conversations with Walther Gerlach!118 If Strauss remembers correctly, Gerlach would have thought about the atomic bomb long before his appointment as "Reichsmarschall's representative for nuclear physics research".

Tempers had just calmed down a little when, on April 5, 1957, Chancellor Konrad Adenauer issued a press release on rearmament that contained a macabre and politically foolish sentence: "Tactical nuclear weapons are basically nothing other than a further development of artillery. «119 This press release was the last straw. Weizsäcker gave lectures on the development of atomic energy and assured that he would not be involved in the production of atomic bombs. He drafted a letter that was signed by eighteen prominent scientists: all but two of the others once had in uranium association.120 In addition to Heisenberg, Hahn, Wirtz and Weizsäcker, Gerlach and Haxel were also among the signatories to the Göttingen Declaration. They were driven by concerns about a future nuclear war.121 A key motive of the signatories was to safeguard German nuclear energy development against the suspicions of the German and, even more so, the international public. The prospect of once again appearing as collaborators in German nuclear armament deeply disturbed Heisenberg and his colleagues. They therefore fled to the front and disapproved of Adenauer's course.122 The Göttingen Declaration found broad public support and ultimately formed the basis for the anti-nuclear movement in the Federal Republic.

Despite considerable moral pressure, some prominent physicists refused to sign the Göttingen Declaration.
Bagge stayed away from the action, Diebner was not even asked.

At the beginning of 1957, Carl Friedrich von Weizsäcker invited specialists in the field of nuclear fusion to a meeting in Göttingen in order to define future research areas.
Winterberg wrote frankly in the magazine Fusion about the preliminary talks for this meeting: "Before I went to the meeting, Diebner warned me: If Weizsäcker finds out that we want to do fusion with small explosions, he will immediately be against it." added: "Weizsäcker doesn't want us to bang."123 Winterberg , who presented Diebner's concept as "fusion by means of convergent shock waves", received Weizsäcker's criticism that "that only with DT and then only in the form of mini-bombs would work." When Winterberg pointed out "that we shouldn't neglect to think about this possibility as well," Weizsäcker interrupted him abruptly: "That's where I stop thinking."124 A few weeks later, in March 1957, Diebner caused one press whirl. He announced that he had found a way to

initiate the process of nuclear fusion without using an atomic bomb. For this he wanted to use the shaped charge technology. The »Spiegel« wrote: »The physicists are even nurturing the bold expectation that one day their planned hydrogen bomb baby could be used to generate usable energy.«

125

In any case, it wasn't wise to go public with such a project. Although it had been speculated about for years, mastery of controlled nuclear fusion was not in sight. Anyone who brought such an idea into play was inevitably confronted with the unsolved problems of its technical realization. That's where Diebner failed.
One month after publication

he suffered a nervous breakdown after his idea.126 Even former colleagues, such as Walter Trinks, distanced themselves from Diebner. Trinks could not get over the fact that Diebner was preparing to exploit his idea alone.127

In 1962, Diebner published an essay in Kerntechnik

in which he summarized his previous research in the field of nuclear fusion: »Subterranean explosions and large-scale demolitions – e.g Weizsäcker said more clearly, "in the form of mini-bombs" was pursued further. In particular, the nuclear researchers at the “Institute for Natural Science Trend Analysis” (INT), which was close to the Federal Ministry of Defence, discussed methods for triggering such miniaturized nuclear fusion explosions.

The nuclear missile idea in West and East

Of course, the winners were interested in the obvious question of whether the Peenemünde engineers had thought about equipping their rockets with weapons of mass destruction and whether there was a connection with the research of the Uranium Association. Von Braun, Dornberger and all the others dismissed such questions. There were no plans on their part to develop nuclear warheads. The German uranium project has not gotten far enough to even be able to have a debate about it. This line of argument was compelling, since all the important American publications stated that German physicists were still a long way from producing an atomic bomb.

Although the people of Peenemünde admitted that they had some knowledge of the work of the Uranium Society, they related this exclusively to the future projects for the development of nuclear propulsion systems for rockets and airplanes. This statement stood in strange contrast to a project that von Braun presented to his American hosts as early as 1946. He and his engineers had barely arrived at Fort Bliss when he submitted the project for a nuclear-tipped missile to the American military. This "very long-range" missile was described as a combination of the A4 and a second stage called the Comet. The rocket should optionally be

can be equipped with malem explosives or with an »atomic warhead«. In this context, von Braun did not shy away from drafting a letter to Robert Oppenheimer and asking about the installation procedures and the detonation mechanism of the atomic bomb. Little did he know that Oppenheimer had already resigned from his post as director of Los Alamos at this point.129 Von Braun probably had the idea of coupling rockets and weapons of mass destruction in 1946.

In the Soviet Union, too, the construction of nuclear missiles was already being considered and German plans were repeatedly discussed. In the summer of 1945, the Soviet rocket engineer Boris Tschertok had a long conversation with his German colleague Hellmut Gröttrup: “Gröttrup was very familiar with the names of Heisenberg and von Ardenne, which I mentioned to him as possible scientists. What's more, he said that in the summer of 1943 the leaders in Peenemünde had reported on a new, powerful explosive in the strictest secrecy. This had been very important for the Peenemünder. They understood very well that the ordinary trotyl placed in the warheads of the A4 missiles in an amount of 700-800 kg gave no greater effect than a 1000 kg aerial bomb. Gröttrup remembers that after von Braun heard about the new explosive, he contacted the command of the land forces in Berlin to increase the explosive power of the rocket warheads in the future.«130

Chertok wrote his memoirs of this meeting fifty years apart, so his date – summer 1943 – should be interpreted with caution. The secret session probably did not take place until the summer of 1944. On the other hand, there is no doubt about the core of Hellmut Göttrup's statements. Rockets for use in war were constructed in Peenemünde. It was in the nature of things that a maximum destructive effect was considered.

The military head of the Soviet nuclear project, NKVD General Zavenyagin, discussed the nuclear missile idea with Manfred von Ardenne in the fall of 1945.131 As early as the spring of 1946, the value of the missile program in the Soviet Union was assigned to nuclear

equal to the program.132 The German A9/10 was under discussion as a means of delivery.

On March 27 and 28, 1946, a high-ranking technical commission chaired by the designer Korolev took place in Berlin.133 In order to be able to assess the status of German rocket research, the statements and documents of Hellmut Gröttrup were mainly used . Project documents for the construction of a two-stage rocket weighing 180 tons were also evaluated. It should have a range of four to seven thousand kilometers. The A9/10 project was assessed by the Soviet Commission as interesting but technically immature. Korolew proposed to first concentrate on the replica of the A4 together with German rocket specialists. So it happened. The scientific and industrial prerequisites for the construction of ICBMs first had to be created in the Soviet Union.

epilogue

For around six decades, the Haigerloch rock cellar symbolized the failure of the German nuclear project. The Third Reich seemed years away from an atomic bomb. That's how many of the main actors of the time saw it. Her perspective found its way into the history books.

Today we know that a significant part of the history of nuclear physics research has not been told. The fusion experiments of the naval researchers, the HWA and the scientists working with Gerlach brought the Third Reich dangerously close to using nuclear weapons. "Hitler's Bomb" was built by a small determined group that trod a technological side path.

After the SS had secured access to rocket development, they also got involved in the organization of nuclear physics work. The further construction and testing of the new weapon should be reserved for a few scientists classified as reliable. SS General Kammler, appointed by Himmler to be responsible for rocket production and the use of the V1 and V2, supervised the work of Gruppe Gerlach.
His aim was to combine the latest results from rocket and nuclear research. However, both weapon systems were not yet mature.

It therefore remains speculative to discuss when a nuclear missile would have been operational. The hopes of the leaders of the Third Reich to be able to mass produce and use such weapons within a few weeks were based on wishful thinking.

Even so, the danger of a final inferno was real. The scientists involved in the last experiments knew this. After all, their invention killed several hundred people on March 3, 1945. Gerlach's dream of being able to contribute to a negotiated solution favorable to Germany with his work came to an end on that day at the latest. The scientists did not have to decide whether or not to use the new bomb. They now feared becoming victims themselves.

It was not until the end of March 1945 that Himmler, Kammler and Speer finally realized that the decisive prerequisites for using the new weapon were missing. A frontline deployment of less tactical nuclear weapons could not have stopped the Soviets, the Americans, or the British, and there were no means of launching a surprise attack on Allied capitals.

After the war, American military justified Eisenhower's decision to begin the invasion in June 1944 with reference to German advances in the production of the latest weapons. The war had to be ended before Hitler had enough new weapons at his disposal. This assessment becomes even more plausible given the fact that "Hitler's bomb" has already been successfully tested.

The disparate source situation made it impossible to answer all questions related to the German nuclear tests. That there were several tests can be taken for granted. The documents, witness statements, aerial photos and measurements do not allow any other conclusion. Among other things, the role of the Reichspost, the share of AEG and Siemens scientists and the Luftwaffe remain to be researched further. The political constellations and decisions associated with the development of the bomb are only vaguely recognizable to date. How much material the scientists working with Gerlach and Diebner had at their disposal and which type of construction they ultimately favored for the bomb still requires intensive investigation, as does the history of some of the locations central to the

A personal word at the end. I also understand the story of "Hitler's bomb" as a warning that everything must be done to prevent dictatorial states or terrorist groups from acquiring uranium enrichment technologies, let alone nuclear weapons. If it was possible sixty years ago to develop tactical nuclear weapons and thus dangerously lower the threshold for nuclear weapons use, how much greater is that danger today? Last but not least, »Hitler's Bomb« is also a lesson in how far a qualified and determined small group can get. The question of the scientist's ethical responsibility, not only towards the society in which he lives, but towards human civilization in general, is more topical than ever.

This book would not have been possible without the help and support of many friends and colleagues.

First and foremost I would like to thank my friend, the journalist Heiko Petermann. In 2001, he provided the decisive impetus for dealing with the subject. Since that time we have researched and discussed together and critically examined the results again and again. It quickly became clear to us that such a complex topic could not be dealt with using either the historian's or the journalist's tools. So we developed new research approaches involving physicists, radiochemists, science and contemporary historians and numerous other experts, which ultimately brought us to our goal.

The most important measurements were made by Professor Uwe Keyser (Physikalisch-Technische Bundesanstalt Braunschweig) and Dr. Dirk Schalch (University of Giessen) carried out and evaluated. Expert opinions and statements were made by Professor Dr. Arthur Scharmann (University of Giessen), Professor Dr. Reinhard Brandt (Philipps University of Marburg) and Professor Uwe Keyser (Physikalisch-Technische Bundesanstalt Braunschweig). Special thanks go to them for taking on the complicated issue of detecting the smallest amounts of radioactive isotopes – despite initial skepticism – and for making a decisive contribution to qualifying the work.

Thankfully, Matthias Muckel (Hanover) took on the task of evaluating the aerial photographs and carrying out further research in the USA. It was his analyzes that put us on the right track with regard to a central question.

Thanks to the help of Russian friends, the head of the research program “History of the Kaiser Wilhelm Society under National Socialism”, Carola Sachse, and the support of the Presidential Commission of the Max Planck Society, the files of the KWI for Physics and other documents central to the project in the years 2002 to 2004 first

be opened up for historical research. Copies of the materials were given to the archive of the Max Planck Society in Berlin.

Valuable work was done by Dr. Burghard Ciesla (Berlin) and Dr. Günter Nagel (Potsdam), who generously provided their latest research on the history of the research department of the Army Weapons Office and the Gottow research institute. dr Matthias Uhl (ZZF Potsdam) advised me in particular on questions relating to the evaluation of Russian sources and gave me an insight into his manuscript »The Book of Hitler«.

As experts for the sources of armaments research under National Socialism, Dr. Helmut Maier (Berlin) and Colonel aD Dieter indicator (Ostbevern) with help and advice. Mr. Andreas Oberholz contributed information on the history of rockets in Thuringia, and I discussed details of Kammler's role with Christian Knaak.

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Last but not least, I would like to thank all the archivists in Belgium, Great Britain, Israel, Italy, the USA, Russia and the Federal Republic of Germany who supported the project with their detailed knowledge. A single assessment would go beyond the scope.

In addition to the public archives and company archives, private bequests were of particular importance. Jörg Diebner (Flensburg) kindly released the few surviving documents from Kurt Diebner for inspection. Herbert Kunz (Brunswick) granted insight into the historically valuable estate of Erich Schumann. This estate is now being used for a

Prepared for transfer to the military archive in Freiburg. Finally, Wolf Krotzy (Wettenberg) made excerpts from the estate of Werner Grothmann, an important contemporary witness, available. Grateful mention should also be made of the countless tips that we received from many quarters and which fell victim to the pressure to cut them.

My literary agent Thomas Karlauf (Berlin) supported the project with aplomb and made many suggestions. I would like to thank the managing director of the DVA, Jürgen Horbach (Munich), for his courage in taking on the subject. And finally I would like to thank the producer Brigitte Müller and my editor Stefan Meyer for their immense work.

Berlin in January 2005

Erich R. Bagge, May 30, 1912 -
June 5, **1996 attended** school in Sonneburg, 1931-1935 studied physics in Berlin and Munich. 1935-38 doctoral student at Heisenberg in Leipzig, habilitation there in 1941. Since October 1939 employee at the KWI for Physics in the service of the HWA. Build an isotope lock. 1945/46 Internment in Farm Hall. 1946 return to Göttingen, employee at the MPI for Physics. 1949 professorship at the University of Hamburg, since 1955 numerous patent applications together with Kurt Diebner. 1956 Managing Director of the Study Society for the Promotion of Nuclear Energy Utilization in Shipbuilding and Shipping Hamburg/Geesthatch (GKSS) and appointment to the German Atomic Energy Commission, since 1957 Director of the Institute for Pure and Applied Nuclear Physics at the University of Kiel, 1977 retired.

Manfred Baron von Ardenne, January 20,
1907ÿMay 26, **1997** 1913-23 Realgymnasium in Berlin. 1923 first patent, 1923-25 training in a precision engineering workshop, 1925/26 studying physics, chemistry and mathematics at the University of Berlin. 1926-28 employed at Loewe Radio in Berlin. 1928-45 Establishment and management of a private research institute for electron physics in Berlin-Lichterfelde, work on radio and television technology, then on electron and ion physics. 1940-45 working on the project "Technical development of processes and systems in the field of atomic destruction" on behalf of the Reichspost. 1943-45 lecturer in physics at the University of Berlin, Jan. 1945 appointment to the Reich Research Council. 1945-55 work in the USSR, head of a research institute in Sinop (near Sukhumi).
1953 Stalin Prize. 1955-90 founder and director of a private research institute in Dresden, from 1957 member of the Research Council of the GDR, from 1991 managing director of the Ardenne Institute for Applied Medical Research GmbH Dresden.

Friedrich Berkei, April 2, 1911ÿSeptember
25, 1966 1934-1937 studied physics at the University of Berlin, receiving his doctorate there in 1938. Since 1939 employee of the HWA in Kummersdorf, deputy of thieves and defense officers. Expert in physics of explosives, NSDAP and SS member since 1937. 1945-66 manager of the company Seeger & Co. in Stadtilm.

Werner Czulius, August 23,
1914, studied physics in Vienna, where he received his doctorate in 1938 with Professor Georg Stetter. Since the end of 1939 he has been employed by the HWA in Kummersdorf. In 1945, after a short stay in the British zone, he returned to Kummersdorf. 1946-55 work in the Soviet Union. 1956 employee in the Siemens research laboratory in Berlin, later in Garching.

Kurt Diebner, May 13, 1905 - July 13,
1964 , studied physics in Innsbruck and Halle, received his doctorate in Halle in 1931 with Gerhard Hoffmann. 1931-33 assistant to Hoffmann, since 1934 briefly employed by the PTR, then consultant at the HWA, at the same time joined the NSDAP. 1939 head of the department for atomic physics in group I (physics) of the research department of the HWA in Kummersdorf. 1940-42 Managing Director of the KWI for Physics, 1940-45 Deputy the representative for nuclear physics research.
1945/46 internment in Farm Hall, 1946 founding of a company for electronic measuring devices in Hamburg, since 1947 manager and co-owner of Durag Apparatebau GmbH Hamburg. Involved in the development of the Study Society for the Promotion of Nuclear Energy Utilization in Shipbuilding and Shipping (GKSS) in Hamburg/Geesthacht (among other things, executive director), since 1957 lecturer at the State Ship Engineering School in Flensburg. 1957/58 employee of the Federal Ministry of Defense. 1949-64 numerous patent applications together with Erich R. Bagge. Editor of the magazines »Atomic Nuclear Energy« and »Nuclear Technology«.

Abraham Esau, June 7, 1884 - May
15, 1955 Doctorate in 1908 at the University of Berlin. 1915-18 soldier, 1919-25 employed at the University of Halle, since 1925 professor for experimental physics at the University of Jena, internationally recognized

well-known high-frequency technician, since 1932 rector of the University of Jena. 1933 joined the NSDAP. 1939 professorship for military telecommunications technology at the TH Berlin. Shortly afterwards he was appointed President of the PTR. Division head of the Reich Research Council. 1939 and 1942/43 representative for nuclear physics research, then representative for high-frequency research. Arrested by the Americans in 1945, extradited to the Netherlands in 1946, charged with looting Dutch property. Acquitted in 1948, 1949 lectureship at the University of Aachen. Since 1952 head of the German research institute for aeronautics in Mülheim/Ruhr.

Carl Friedrich Freiherr von Weizsäcker, June 28, 1912 attended school in Basel, Copenhagen, Berlin, where he graduated from high school in 1929. 1929-33 studies physics in Berlin and Leipzig. Doctorate with Heisenberg with a theoretical work, then assistant, 1936 habilitation. 1937-42 employee at the KWI for Physics in Berlin.
1942-45 Professor of theoretical physics at the University of Strasbourg. 1946 Return to Göttingen, head of the theoretical department of the MPI for Physics. 1957-69 professor of philosophy at the University of Hamburg. 1970 director of the newly founded MPI for research into living conditions in the scientific and technical world in Starnberg. 1980 retirement.

Walther Gerlach, August 1, 1889 - August 10, 1979 attended school in Wiesbaden, 1908-1912 studied physics in Tübingen. 1912 Doctorate with Friedrich Paschen and Edgar Meyer in Tübingen with an experimental work. There also in 1916 habilitation.
Then assistant at the University of Göttingen. War service with the Berlin pioneer troops. 1919/20 Physical laboratory at the Elberfeld paint factory. 1921-25 assistant at the University of Frankfurt/Main. 1925-1929 professor for experimental physics in Tübingen, 1929-1945 in Munich. 1944/45 "Representative of the Reich Marshal for nuclear physics research". 1945/46 Internment in Farm Hall. 1946 visiting professor at the University of Bonn, from 1948 director of the Physics Institute at the University of Munich, later rector of the university. 1957 retirement. 1951-61 Vice President of the German Research Foundation (DFG).

Georg Graue, July 29, 1903ÿMarch 22, **1993** Doctorate with Otto Hahn, 1933 NSDAP, leader of the lecturers' association, technical director at the KWI for physical chemistry. 1943–45 Head of the War Economics Office of the Reich Research Council. 1945 arrest by the NKVD. After his refusal to work for Soviet authorities, sent to the Ketschendorf special camp. 1948 release from prison. 1949-51 Head of the chemical laboratory at the Institute for Ferrous Metallurgy at the Bergakademie Clausthal. Employees of the Technical Material Testing Institute of several companies.

Otto Hahn, March 8, 1879ÿJuly 28, 1968 attended school in Frankfurt/M. 1897-1901 studied chemistry in Marburg, 1901 doctorate with a thesis on organic chemistry. 1902-04 assistant in Marburg. 1904-06 Research stay in London and Montreal. 1907 Habilitation at the University of Berlin. 1912 head of department at the newly founded KWI for chemistry, involved in the preparation of the gas war, from 1926 director of the institute. 1938 Discovery of uranium fission, for which he received the 1945 Nobel Prize in Chemistry. Internment at Farm Hall from July 1945 to January 1946. 1946 Return to Göttingen from British internment. Leading role in the reconstruction of the KWG/Max Planck Society, from 1946-60 its President.

Paul Harteck, July 20, 1902 - January 21, **1985 attended** school in Vienna. 1921-26 studied chemistry and physics in Vienna and Berlin. Doctorate there in 1926. 1926-28 assistant to A. Eucken at the TH Breslau. 1928-33 worked for F. Haber at the KWI for Physical Chemistry and Electrochemistry in Berlin. 1931 Habilitation at the Berlin University. 1933-34 research stay with E. Rutherford in Cambridge. 1935-45 Director of the Institute for Physical Chemistry at the University of Hamburg. Since 1937 expert work for the HWA. Internment at Farm Hall from July 1945 to January 1946. 1946 after returning from British internment again in the service of the University of Hamburg. 1951 Professor at Rensselaer Polytechnical Institute in Troy (New York).

Otto Haxel, April 2, 1909–
February 26, 1998 Studied physics at the Technical University of Munich and at the University of Tübingen; 1933 Doctorate in Tübingen. 1936 Habilitation in Tübingen with a thesis on the core spectra of the light elements. Since 1937 at the TH Berlin and from 1939 lecturer in physics. Joined the SA in 1933 and the NSDAP in May 1937. Exempted from military service since the beginning of the war; from 1943 drafted into the research department of the Naval Weapons Office as a physicist. After the end of the war briefly in Munich and Tübingen. 1946-51 Assistant at the MPI for Physics in Göttingen. 1951 Professor at the University of Heidelberg. 1970-75 scientific and technical director of the nuclear research center in Karlsruhe. 1971 Grand Federal Cross of Merit.

Werner Heisenberg, December 5, 1901 -
February 1, **1976 attended** school in Munich. 1920-23 studied physics in Munich. Doctorate with A. Sommerfeld with a theoretical work.
1923-1927 assistant at the University of Göttingen, 1924 habilitation, several study visits with N. Bohr in Copenhagen. Fundamental work on the foundation of quantum mechanics, for which he received the Nobel Prize in Physics in 1933. 1927-42 professor for theoretical physics at the University of Leipzig. 1942 appointed director at the KWI for Physics in Berlin, at the same time professor at the University of Berlin. Internment at Farm Hall from July 1945 to January 1946.
In 1946 he returned to Göttingen and, as director of the MPI for Physics, was instrumental in rebuilding physical research in the Federal Republic. 1958 Relocation of the institute to Munich.
1970 retirement.

Gustav Hertz, July 22, 1887 - October
30, 1975. Graduated from high school in 1906. Studied mathematics and mathematical physics in Göttingen, Munich and Berlin. Doctorate in 1911 at the University of Berlin. Then assistant, together with James Franck he carried out electron impact experiments in 1913. For these experiments, Franck and Hertz received the 1925 Nobel Prize in Physics. Seriously wounded in World War I. 1920-25 Philips Laboratories in Eindhoven (Netherlands), where gas mixtures are separated by diffusion. 1926 Professor of Physics at the University of Halle, 1927

Director of the Physical Institute of the TH Berlin, 1932 Separation cascade for gaseous isotope mixtures. In 1935 he resigned from his professorship for political reasons and took over the management of a research laboratory set up especially for him at Siemens in Berlin. Research in the fields of electron and atomic physics, gas discharges, gas purification and separation processes. Leading role in cyclotron construction. 1945-54 as part of the Soviet atomic bomb project head of a research institute near Sukhumi, further development of the gas diffusion process for uranium isotope separation; 1951 Stalin Prize; 1954-1961 Director of the Physics Institute at the Karl-Marx University in Leipzig, services in the development of nuclear physics and technology in the GDR. Since 1957 member of the Research Council of the GDR.

Friedrich Georg Houtermans, January 22, 1903ÿMarch 1, **1966** Studied physics, mathematics and physical chemistry 1921-27 in Göttingen. Doctorate in 1927. Coined the term "thermonuclear reaction" with Atkison and Gamov in 1928. 1928-33 scientific assistant at the Physics Institute of the TH Berlin. Habilitation 1932. Member of the KPD since 1927, 1933 emigrated to England, from 1935 head of the department for radioactivity at the University of Kharkov (Ukraine), from December 1937 to May 1940 in NVKD custody on false charges, then extradited to the Gestapo , released in the summer of 1940. Work at Manfred von Ardenne's private institute, where he wrote, among other things, in the summer of 1941 the report "On the question of the initiation of nuclear chain reactions", from 1943 PTR, research commissioned by the OKM.
From 1945-51 work at the Institute for Theoretical Physics in Göttingen, 1952 Professor of Physics at the University of Bern.

Hans Kammler, August 26, 1901 – ?

In the spring of 1919 Freikorps. Study of architecture. Doctorate in 1932 with a thesis »on the evaluation of land development for urban settlements«. 1931 NSDAP, 1933 SS. August 1934 Councilor in the Reich Ministry of Food. 1936 move to the Reich Aviation Ministry. 1940 transfer to the Economic Administration Main Office (WVHA) of the SS, since February 1942

pe C (construction). From September 1943 he was Himmler's special representative for the A4 program, in January 1944 he was promoted to SS group leader and lieutenant general of the Waffen-SS, from August 1944 he was special representative for rocket operations. On March 27, 1945 Hitler appointed him special representative for the production of jet aircraft. Also responsible for the nuclear tests in spring 1945. His trail was lost near Prague in early May 1945. Later pronounced dead.

Wilhelm Ohnesorge, June 8, 1872ÿFebruary 1, **1962** After high school in Frankfurt/M. 1890 Entry into service at the Reichspost. Studied mathematics and physics in Kiel and Berlin. Since 1900 Oberpostdirektion Berlin. 1914 communications officer at the Supreme Army Command and 1915 head of the telegraph department at the Imperial Headquarters. 1920 Oberpost in Dortmund. Founding of the first local group of the NSDAP outside of Bavaria. 1923 Return to Berlin and close contact with the DNVP. From March 1933 State Secretary in the Reich Post Ministry and from 1937–45 Reich Post Minister. By 1945 he had transferred at least 20 million Reichsmarks to the »Fuhrer's Cultural Fund«.

In 1942 placed under the postal protection of the SS. Awarded the Knight's Cross and the War Merit Cross in 1944. Arrested by American troops in May 1945 and interned until mid-1948. Classified as »principal culprit« in various tribunal proceedings in Bavaria.

Peter Adolf Thiessen, April 6, 1899ÿMarch 5, **1990** Volunteer in the First World War. Studied chemistry in Breslau, Freiburg, Greifswald and Göttingen, 1923 doctorate and 1926 habilitation with Nobel Prize winner Richard Zsigmondy. 1925-28 and 1933-45 member of the NSDAP. 1933 head of department at the KWI for physical chemistry and electrochemistry in Berlin. 1934-37 advisor to the Reich Ministry of Education. 1935-45 director of the KWI for physical chemistry and electrochemistry. Head of the chemistry division of the Reich Research Council. 1945-56 as a specialist in the USSR, head of a German research group working on the Soviet r

program contributed. 1956 Return to Berlin, re-admission to the German Academy of Sciences and Director of the Institute for Physical Chemistry until 1964, at the same time Professor at the Humboldt University in Berlin. 1964 retired. 1957-65 Chairman of the Research Council of the GDR.

Walter Trinks, November 14, 1910 - October 15, **1995** Studied mathematics, chemistry and physics at the University of Berlin. Doctorate under Max von Laue with a thesis »on multiple scattering on small spheres«. From June 1940 to April 1945 he was head of the department Wa FI b "Explosive Physics and Shaped Charges" in the Army Research Institute in Kummersdorf. His postdoctoral thesis »Computational Investigations into the Effects of Explosives«, written by Erich Schumann in 1944, was declared a secret commando matter. 1946 American internment. 1948-50 Work at Oerlikon in Zurich (Switzerland). 1950-57 Industrial activity in Sweden. 1958-75 head of department in the Federal Ministry of Defence. 1975 retirement. Submitter of numerous defense technology patents.

Rolf Wideröe, July 11, 1902 - October 11, 1996 Youth and school days in Norway. 1920 studied electrical engineering at the TH Karlsruhe. 1924 Worked in a locomotive factory for the Norwegian State Railways. 1925 back to the TH Karlsruhe, 1928 doctorate at the TH Aachen. Worked out the principle of the linear accelerator and demonstrated its practical usefulness. 1929-32 Employed in the transformer works of the AEG company in Berlin. From 1933 for a Norwegian power plant company of the Swiss company Brown, Boveri & Cie. active. In 1943-45 he worked on the development of a circular accelerator on behalf of the German Air Force. With his help, the CHF Müller company in Hamburg was able to put the first European betatron with a power of 15 MeV into operation in 1944. Imprisoned for a short time after the war. Since 1945 worked for the BBC in Switzerland. From 1948 lecturer at the ETH in Zurich. From 1952 worked for CERN in Geneva and since 1959 for DESY in Hamburg.

Analysis of soil samples collected at the Gottow (Brandenburg), Rügen (Mecklenburg Western Pomerania) and Ohrdruf (Thuringia).

1. Army research center in Kummersdorf/test center in Gottow

Location and use:
Kummersdorf is the name of an estate district south of Berlin near Luckenwalde. After 1871 a large artillery firing range was built there. In the 1930s, construction of the “Gottow Experimental Site” began on the western edge of the Army Research Institute. It consisted of five large building groups, each of which had numerous laboratories, workshops and offices. There were also central workshops, material and equipment stores and an electrical control center. Fifteen well-equipped test stands for testing a wide variety of weapon systems were gradually built.

From the summer of 1943, the five departments of the research department of the Army Weapons Office (physics, chemistry, remote control, theoretical ballistics/mathematics and organization) were housed in the buildings.

Diebner's test stand was a few hundred meters away from the buildings in the forest on the outer edge of the site. The reactor tests GI, GIII a and b and GIV were carried out there between 1942 and 1945.

Between 1944 and 1945 the Army Research Institute was used by the Soviet Army. The remains of Diebner's test stand, including the reactor boiler, were dismantled on May 8, 1945 and taken to the Kurchatov Institute in Moscow.

The property now belongs to the federal government, represented by the Federal Agency for Real Estate Tasks.

Inspections:
The remains of Diebner's test facility in Kummersdorf/Gottow were first examined in February 2000 by employees of the Federal Office for Radiation Protection. Measurements of the local

dose rates, an investigation of the surface contamination and a laboratory evaluation of the soil samples taken. Significant local dose rates were found in an area approximately fifteen by fifteen meters north of the concrete base. It was a matter of “clear, but highly localized contamination”. Among other things, a 4.5 percent share of U235 in the total uranium activity was measured.1

According to the Federal Office for Radiation Protection, there is no immediate danger for persons who happen to be in the contaminated area. The contaminated soil should nevertheless be disposed of appropriately.

Further inspections and sampling by scientists from Prof. Dr. Scharmann (Universities of Giessen) took place in the summer of 2003 and later. In contrast to the first inspection, they were used less for the immediate assessment of potential dangers and more for historical investigation.
The questions to be clarified were how material got out of the reactor into the outside area, whether the reactor had become critical and whether transuranic elements, in particular plutonium, could be formed in it.

Sample treatment:
Several soil samples were taken under supervision, including a “ceramic chunk” weighing 34 grams, a paraffin chunk weighing 70 grams and an unfractionated soil sample weighing 717 grams by the central radiation protection group at the University of Giessen. These samples were examined by gamma and alpha spectrometry.

With the help of gamma spectrometry, 8,366.5 Bq/kg U238 and 498.3 Bq/kg U235 were measured in the unfractionated soil sample. The paraffin chunk even showed 2,700,000 Bq/kg U238 and 101,000 Bq/kg U235.2 The alpha spectrometry then also provided evidence of plutonium.3 A soil sample of 3.7 grams contained about 6,200 Bq/kg U238 and about 40 Bq/kg Pu239/Pu240. A piece of paraffin weighing 6.3 grams contained 13,300 Bq/kg U238 and approx. 350 Bq/kg Pu239/Pu240. The measurement accuracy was assumed to be 50 percent.

Conclusion: The remains of reactor materials (U238, slightly enriched U235, thorium-232 and paraffin) can be found in the vicinity of the concrete block that served to accommodate the experimental reactor. The damage to the outer wall of the concrete block and the scattering of the material below the location of the loading crane suggest that there was a deflagration of nuclear fuel after the reactor vessel was removed. The reason for this is probably to be found in xenon-135 poisoning of the reac

An energy release in the reactor vessel during its positioning in the concrete container is possible. This is supported by the conversion of uranium into plutonium. The isotope vectors of U235/Pa231/Th227 indicate disturbances in the natural balance. Such disturbances occur either as a result of chemical cleaning processes, the targeted addition of actinides or their formation as a result of neutron irradiation.

2. Bug/complaint

Location and use: On the north-western edge of the Baltic Sea island of Rügen there is a narrow tongue of land shaped in a southerly direction - the Bug. For a long time, only a post office, a weather station and a forester's house were located there. From 1935 it was used for military purposes by a seaplane squadron and a sea rescue group. The site remained in military use until the end of 1991. After that, the naval base near Dranske was closed and the site designated as a conservation area.

Aerial photos: American aerial photos from April 19, 1944 and April 4, 1945 as well as Russian and German aerial photos from 1953 and 1983 were available for evaluation. On an aerial photo from April 1944, a freshly cut swath, two structures and a tower-like building can be seen on the suspected area. There is a house to the south. A year later the tower is destroyed, the house is damaged

and the other buildings no longer exist. Part of the open space seems to have devastated. A depression can be seen in the middle of this area on the aerial photo from 1953. It is likely to have been there as early as 1945, but cannot be clearly identified on the aerial photo from April 1945, which is only of moderate quality.

Inspections:
After several inspections, a suspicious area was discovered in the spring of 2003 on the southern tip of the Bug Peninsula. It is located a few kilometers from the site of the former naval base. Around a crater with a diameter of about 25 meters and a depth of about five meters today, there is an area of three hundred by three hundred meters covered only with grass. A few stunted pines stand in the clearing. To the west you will find wall-like deposits, in front of which are the remains of concrete bunkers that are partially covered by sand.

Sample treatment:
The loose soil structure, which also underwent significant changes after 1945, only allowed samples to be taken by the Gießen university laboratory at the crater rim and near the former post office.

Glazing and melting black particles were found in the area of the smaller crater. They show a slightly increased activity.

Gamma spectrometry of the soil samples from the rim of the crater and from the post station revealed slightly increased Cs137 and U238 activities, but these were still in the range of the natural background. Only the samples taken from the foundations of the former post office show increased cesium 137 values, which are about five times higher than the zero samples.4 A preparation obtained by sedimentation is significantly higher than the values customary locally

Conclusion:

The samples show some anomalies. It is assumed that taking samples at greater depths will enable clearer statements to be made.

3. Ohrdruf/Thuringia

Location and use:

Since 1871, the site of what later became a military training area has been used as a maneuvering area. The expansion to a training ground began before the First World War. From 1936 extensive expansions began. In 1941/42 a small camp for Russian prisoners of war was set up.

In October 1944 the military training area was taken over by the SS. This set up satellite camps on the grounds of the Buchenwald concentration camp. On April 5, 1945, the site was occupied by the 4th American Armored Division.

From 1947 to 1991 the Soviet Army used the Ohrdruf training area. On December 22, 1993, the site was then taken over by the German Armed Forces.

Aerial photos: The area was overflown and photographed by the US Air Force at the end of 1944 and in spring and June 1945.5 The suspected area was originally a depression with a diameter of fifty meters and a depth of up to four meters at the eastern tip of the » Triangles« identified.

The probable center of the explosion was only discovered during a second, more in-depth evaluation. It is almost in the middle of the triangle. It is a shallow hollow with a diameter of around 50 metres. Next to it, a very sharply contoured crater of around 20 meters is clearly visible. On an aerial photo from the end of 1944, nothing was visible at this point. The presumed test area was extensively mowed in the spring of 1945.

Inspections:

The first inspection and sampling took place in 2003 under the supervision of the Bundeswehr. Since a hollow on the edge of the military training area was initially identified as a suspected area, the first sampling focused on this area. Soil samples, each weighing more than one kilogram, were taken at a depth of up to forty centimeters at three positions on the inside and outside

taken from the edge of the hollow and from four locations up to 450 meters from the center.

Sample treatment and laboratory analysis: Using special sedimentation methods, particles were found in the samples that had melted at very high temperatures. With the help of simple measuring instruments, a slightly increased level of radioactivity could be detected in these particles.

Laboratory tests of the particles followed. Using gamma spectrometry, levels of caesium-137 were found to be well above the national average. Cesium-137 values were between 27 and 70 Bq/kg in several samples. The state average is given by the Federal Office for Radiation Protection as 11 to 28 Bq/ kg.6 Approx. 7 Bq/kg cobalt 60 could be detected in the O 2b sample.

In a cross-check based on the same material, both the increased values for cesium 137 and for cobalt 60 were confirmed by the Physikalisch-Technische Bundesanstalt, with even higher values being measured in some cases. A Cs 137 value that was up to twenty times higher than the national average was found in one sample.

Neither the increased cesium-137 nor the cobalt-60 concentration are of natural origin. "They are due to a nuclear event - of whatever kind."7

Alpha spectrometry was also used to detect U238, U235 and Pu239, although the ratio of U238 to Pu239 requires further investigation.

Conclusion: The increased cesium-137 values and the cobalt-60 activity indicate a nuclear event. Professor Reinhard Brandt: "The essence of this event is that during the explosion nuclear reactions with energy release also clearly took place."8

The second inspection took place on February 6, 2005, again under the supervision of the Bundeswehr. Participants were: Prof. Keyser (PTB and TH Braunschweig), Lieutenant Colonel Horstmann (Military Area III),

Captain König (site commander Ohrdruf), Dr. Röllig (Military District Administration East) and Herr Ritter (Military District Administration East), a ZDF TV team headed by Stefan Brauburger, Dr. Rainer Karlsch and Heiko Petermann.

The inspection took place in the eastern area of the military training area ("triangle" south of the commander's hill) and was carried out from the east to the west. The aim was to physically detect traces of radioactive materials that are believed to have arisen as a result of nuclear testing.

The measurements were carried out using a Berthold LB 64-11 neutron monitor and a Contamat alpha-beta-gamma monitor. A germanium detector originally also intended for the measurements could not be used due to the poor space conditions on site.

Measurements were taken at eight points and soil samples were taken. In the area under investigation, clear radiation activities can be measured in some cases, which increase in the direction of the assumed center of the explosion.

The lowest activities were measured in the eastern area of the »triangle« (measuring point 1 – Mulde and measuring points 2 to 4). They are not or hardly above the local values. Point 5, about 400 meters south-east of the suspected explosion center, showed a value three times the blank sample. Point 6, about 300 meters west of the center, showed an alpha, beta and gamma activity of 6 bq and a neutron value of 0.06 nSv/hour.

At point 7, about 100 meters south of the center, an alpha, beta and gamma activity of 30 bq and a neutron intensity of 0.07 nSV were measured.

The decisive area of the presumed test area could not be entered due to ammunition residues from the shooting operation.

At all measuring points, approx. 10 centimeters were measured Deep soil samples taken.

Result:
Prof. Uwe Keyser confirmed a disproportionately high proportion of fission products: “There is a wide spectrum of enriched material that is not caused by a natural source. The isotope anomalies are sometimes drastic and do not match any known individual result. Chernobyl can be ruled out as the sole cause for the origin of the fission products. Several events have overlapped in the study area: natural radioactivity, probably two nuclear events and later contamination. From none of the positions examined on site

there is a radiation hazard.«9

The isotopes and the isotope ratios are further investigated in nuclear physics at the PTB in Braunschweig and at the high-flux reactor of the Lane-Langevin Institute in Grenoble or in the GSSK Geesthacht.

abbreviations

A4	Aggregat 4, rocket, also called V2
A.E.G	General Electric Company
APS	Office for special physical questions (the Reichspost)
Bq	becquerel
CPVA	Chemical-Physical Research Institute
ctr	Chemical-Technical Reich Institute
cs	cesium
co	cobalt
D2O	heavy water
DD	deuterium-deuterium
DT	deuterium tritium
Element 94	Plutonium
FEP	Office group for research, inventions and patents
GRU	Glavnoye razvedyvatelnoye upravleniye (Main Intelligence Directorate, Red Army espionage organization)
HWA	Army Weapons Office
IT	interest group
IVN	Industrial research station in Neubrandenburg
KWG	Kaiser Wilhelm Society
KWI	Kaiser Wilhelm Institute
MeV	megaelectronvolt
MPG	Max Planck Society
MfS	Ministry of State Security
MWA	Naval Weapons Office
NKVD	Narodnyi Komissariat Vnutrennych Del (Soviet People's Commissariat of Internal Affairs)
NSDAP	National Socialist German Workers' Party
ODL	local dose rate
OK	Army High Command
OKM	High Command of the Navy
buttocks	polonium
PTB	Physical-Technical Federal Institute

PTR	Physical-Technical Reich Institute
poof	plutonium
RSHA	Reich Security Main Office of the SS
SD	security service
sed	Socialist Unity Party of Germany
Sv	sievert
th	Technical University
TT	tritium tritium
u	uranium
V1/V2	"Revenge weapons"
CC	Central Committee

Documents

I) Excerpt from the report by Carl Friedrich von Weizsäcker "Energy generation from the uranium isotope of mass 238 and other heavy elements (production and use of element 94)", probably early summer 1941. (Archive of the MPG, KWI for Physics, No. 7 , Pu)

The report deals with the generation of energy from a uranium reactor. Six patent claims are attached, in which the possibilities for generating energy from plutonium are set out. The possible use of plutonium as a nuclear explosive in a bomb is also mentioned.

II) Excerpt from the report of the Army Weapons Office from February 1942, author Kurt Diebner and employees. (Reprinted with the kind permission of Prof. Dr. Jörg Diebner.)

In preparation for the meeting of the Reich Research Council with the physicists of the Uranium Society on February 26, 1942, Diebner and his staff wrote a 144-page research report. The construction of a heavy water reactor was considered possible in the foreseeable future and the construction of an atomic bomb was considered feasible in principle. For the first time, the critical mass for a plutonium bomb was approximately correctly estimated.

III) Formula collection by Friedrich Berkei, (probably 1944). (Reprinted with permission from Dieter Berkei.)

The worksheets of Friedrich Berkei, Diebner's deputy, contain formulas for the fusion of light elements. This was an important theoretical basis for nuclear shaped charge reactions plus a neutron source.

IV) Letter from Kurt Diebner to Werner Heisenberg dated November 10, 1944. (Archive of the MPG, KWI for Physics, folder 5-1.)

In the fall of 1944, a previously unknown reactor test took place in Gottow. Kurt Diebner informed Werner Heisenberg about pro-

problems of the new test arrangement (GIV). The reactor later went critical and failed shortly thereafter.

V) Sketches Gerlach 1944. (Diary Walther Gerlach 1943/44, NL 80, No. 270, Bl. 39f., Deutsches Museum Munich.)

Walther Gerlach's sketches show spheres, lenses and half-shells with one or more focal points. In addition to these sketches there are formulas for thermonuclear reactions.

VI) Letter from Prof. Dr. Erich Schumann to Dr. Ernst Telschow from April 2nd, 1948. (Archive of the MPG, Abt. III, Rep. 83, No. 286.)

At the end of 1947, the former General Secretary of the KWG, Ernst Telschow, asked the former head of the research department at the HWA, Erich Schumann, for a summary of important research work at the HWA. Schumann then presented the theoretical concept for the experiments on the fusion of light elements carried out under his leadership.

VII) Statement IV of Kurchatov on documents "About a German Atomic Bomb" received from the HVA of the Red Army General Staff. (LDRjabev (ed.), Atomnij Projekt CCP (The Soviet Atomic Project 1938-1945), second half volume, Moscow 2002, p. 260f. Translation by R. Karlsch)

On March 30, 1945, the leader of the Soviet nuclear project wrote a statement on the reports of the military intelligence service (GRU) on the nuclear tests in Germany. He passed this on to Stalin and Molotov. A copy went to the head of the Main Administration for Military Intelligence, Lieutenant General Ivan I.
Ilyitshov.

Document I

Für die in der Anlage überreichte Patentanmeldung ist als Erfinder dem Reichspatentamt gegenüber namhaft zu machen:

Herr Dozent Dr. C.F. von Weizsäcker

Berlin-Dahlem, Bitterstr. 3

Anlage zu Pb. Nr. 111/41 g

sie spalten, damit eine Explosion vermieden wird. Oder aber man überschreitet diese Größe und läßt den ganzen Vorgang explosiv verlaufen. Dieser Sprengstoff würde an frei werdender Energie pro Gewichtseinheit jeden anderen rund 10 Millionen mal übertreffen und nur mit dem reinen ^{235}U vergleichbar sein.

Patentansprüche.

1. Verfahren zur Energieerzeugung aus ^{238}U, dadurch gekennzeichnet, daß ^{238}U mit zwei thermischen Neutronen beschossen wird, wodurch zunächst über β-Zerfälle ein Element 94 der Masse 293 entsteht, das durch das zweite Neutron eine Kernspaltung erfährt, bei der sowohl eine ungeheure Energie abgehoben wird, als auch neue Neutronen und Kerne entstehen.

2. Verfahren zur Energiegewinnung aus ^{238}U nach Anspruch 1, dadurch gekennzeichnet, daß die zur Umwandlung größerer Mengen des ^{238}U in Element 94 notwendigen Neutronen in einer "Uranmaschine" erzeugt werden.

3. Verfahren zur Energieerzeugung aus ^{238}U bzw. Element 94 nach Anspruch 1, dadurch gekennzeichnet, daß das durch Neutronenanlagerung erzeugte Element 94 durch bekannte chemische Verfahren von dem verbleibenden Uran abgetrennt wird und dann in reiner bzw. geeignet wählbarer Konzentration verwendbar vorliegt.

4. Verfahren zur Energieerzeugung und Neutronenproduktion aus schwer spaltbaren schweren Kernen (z.B. ^{238}U, Thorium, Blei, Wismut etc.), dadurch gekennzeichnet, daß das nach Anspruch 3 erhaltene Element 94 diesen Elementen in geeigneter Menge zugesetzt wird, so daß sie einen autokatalytischen Spaltprozeß durch Neutronen durchmachen können, bei dem Energie erzeugt wird und neue Atomkerne entstehen.

5. Verfahren zur explosiven Erzeugung von Energie und Neutronen aus der Spaltung des Elements 94, dadurch gekennzeichnet, daß

-5-

das nach Anspruch 3 hergestellte Element 94 in solcher Menge an einen Ort gebracht wird, z.B. in eine Bombe, daß die bei einer Spaltung entstehenden Neutronen in der überwiegenden Mehrzahl zur Anregung neuer Spaltungen verbraucht werden und nicht die Substanz verlassen.

6. Verfahren zur Erzeugung sehr kleiner handlicher Maschinen zur Gewinnung von Kernenergie und von Neutronen, z.T. nach Anspruch 3 und 4 und unter Zugrundelegung der Kenntnisse über eine "Urammaschine", dadurch gekennzeichnet, daß man nur so viel Element 94 an einem Ort vereinigt, (u.U. nach Beimischung geeigneter, neutronenbremsender und/oder absorbierender Zusatzelemente) daß Explosionen vermieden werden, und die Energieabgabe kontinuierlich erfolgt.

I. Einleitender Überblick.

1. Entwicklung des Problems.
2. Wirkungsweise energieerzeugender Anordnungen.
3. Experimentelle Untersuchung der Materialien.
4. Herstellung der notwendigen Materialien.
5. Künftige Entwicklung.

1. Entwicklung des Problems.

Die Arbeiten über die Energieerzeugung aus Uran bezwecken, der Technik eine neue Energiequelle zu erschließen. Die freizumachende Energie hat ihren Sitz im Atomkern. Sie kann - mit dem Grad von Gewißheit, mit dem aus Laboratoriumsversuchen auf Großversuche geschlossen werden darf - zum Antrieb einer Wärmekraftmaschine verwendet werden, deren Brenndauer das Zehntausendfache der Brenndauer einer gleich großen Gewichtsmenge normaler Brennstoffe ist. Es besteht Aussicht, die Energie auch in einem Sprengstoff anzuwenden, der die millionenfache Sprengwirkung der gleichen Gewichtsmenge Dynamit hätte.

Es ist seit langem bekannt, daß die Atome, aus denen alle bekannten Stoffe bestehen, selbst wieder aus einem dichten Kern und einer ausgedehnteren Hülle zusammengesetzt sind. Die im Kern enthaltene Energie ist etwa eine Million mal so groß wie die in der Hülle enthaltene. Alle bekannten chemischen Reaktionen - also insbesondere alle Verbrennungsvorgänge - beruhen auf Umlagerungen in der Hülle der Atome. Wäre es möglich, entsprechende Umlagerungen im Kern zu veranlassen, so wäre daher die millionenfache Energieausbeute normaler Verbrennungen zu erwarten.

Derartige "Kernreaktionen" sind aus dem Laboratorium bekannt. Einige Elemente wie Radium, Uran, Thorium u.a. haben

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(im allgemeinen Wasserstoff) enthält. Beim Zusammenstoß mit diesen Atomen geben die Neutronen ihre Energie ab und werden so abgebremst. Es ist günstig, die Bremssubstanz nicht mit dem Uran zu mischen, sondern die Maschine aus abwechselnden Schichten von Uran und Bremssubstanz aufzubauen; denn dann kommt ein Neutron, das einmal in die Bremssubstanz eingetreten ist, im allgemeinen nicht wieder mit einem Uranatom in Berührung, ehe es seine ursprüngliche Energie abgegeben hat und dadurch für die Spaltung von U_{235} hochwirksam geworden ist.

Die Bremssubstanz selbst absorbiert freilich ebenfalls Neutronen. Man muß deshalb möglichst schwach absorbierende Bremssubstanzen wählen. Für eine Maschine mit natürlichem Uran kommt als Bremssubstanz nach unserer heutigen Kenntnis nur schwerer Wasserstoff (Deuterium) in Betracht, der leider nur als sehr geringe Beimengung des gewöhnlichen Wasserstoffs vorkommt und in mühsamen Verfahren abgetrennt werden muß.

Eine völlige Trennung der beiden Uranisotopen voneinander liegt technisch noch in weiter Ferne. Aussichtsreich ist aber eine Anreicherung von U_{235} etwa auf das Doppelte der ursprünglichen Menge. Dadurch würde der störende Einfluß des U_{238} vermindert; man würde kleinere Maschinen bauen und vermutlich gewöhnlichen Wasserstoff als Bremssubstanz verwenden können.

b. Sprengstoff. Die störende Wirkung von U_{238} nimmt mit wachsender Temperatur zu. Ein Sprengstoff würde daher höchstens sehr kleine Mengen von U_{238} enthalten dürfen. Außer der vollständigen Isotopentrennung, die grundsätzlich sicher durchführbar, aber technisch sehr schwierig ist, kennen wir heute theoretisch einen zweiten Weg zur Herstellung eines Sprengstoffs, der aber erst erprobt werden kann, wenn eine Wärmemaschine läuft. Aus U_{238} bildet sich nämlich durch die Absorption von Neutronen ein Stoff ("Element 94"), der noch leichter spaltbar sein muß als U_{235}. Da dieser Stoff chemisch von Uran verschieden ist, muß man ihn aus dem Uran einer stillgelegten Maschine leicht abtrennen können. Doch kennen wir heute weder die Menge, in der er entsteht, noch seine Eigen-

schaften genau genug für eine ganz sichere Voraussage.

Da sich in jeder Substanz einige freie Neutronen befinden, würde es zur Entzündung des Sprengstoffs genügen, eine hinreichende Menge (vermutlich etwa 10 - 100 kg) räumlich zu vereinigen.

3. Experimentelle Untersuchung der Materialien.

Die Arbeitsgruppe hat zahlreiche Experimente durchgeführt, die im wesentlichen drei verschiedene Ziel verfolgten:

1. Genaue Kenntnis des Spaltungsvorgangs (Bericht III 1)
2. Feststellung der zum Bau der Maschine geeigneten Materialien.
3. Feststellung der richtigen Menge, räumlichen Anordnung und Dimensionierung der verwendeten Materialien.

Das erste Ziel ist rein wissenschaftlich und soll lediglich der technischen Anwendung eine möglichst breite Erkenntnisgrundlage liefern. Das zweite und dritte Ziel sind technischer Natur. Um diese beiden letzten Ziele zu erreichen, wurden zwei Sorten von Experimenten ausgeführt:

1. Untersuchung einzelner Materialien (Bericht III 2)
2. Modellversuche (Bericht III 3)

Es hat sich als notwendig erwiesen, die kernphysikalischen Eigenschaften der Materialien sehr viel genauer zu bestimmen, als es früher üblich war. Die Modellversuche prüfen eine der geplanten Maschine ähnliche, aber kleinere Anordnung; sie werden entsprechend den Fortschritten der Materialbeschaffung mit immer größeren Anordnungen wiederholt und sollen so schließlich zum Bau der ersten Maschine überleiten.

Das wichtigste Ergebnis der Experimente ist, daß aus etwa 5 to Uranmetall und 5 to schwerem Wasser eine selbsttätige Maschine gebaut werden könnte. Doch sind die genannten

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inzwischen entwickelt worden. Wohl den größten Fortschritt machten in dieser Zeit die Arbeiten zur Herstellung von metallischem Uran und Schwerem Wasser. Diese Verfahren sind nicht nur technisch gelöst, sondern auch die Einstellung der Lieferfirmen auf die nötige Produktion ist weitgehend erfolgt und beide Substanzen - vor allem aber Urammetall - stehen schon in beträchtlichen Mengen zur Verfügung.

Auf jeden Fall sollte nach dem derzeitigen Stand schon die technische Ausgestaltung und Ausnutzung des Energieproblems vorbereitet werden. Die ungeheuere Bedeutung, die sich für die Energiewirtschaft im allgemeinen und für die Wehrmacht im besonderen ergibt, rechtfertigt solche Vorausarbeiten umso mehr, als auch in den Feindstaaten - vor allem in Amerika - intensiv an dem Problem gearbeitet wird.

Die voraussichtliche Leistung einer Urammaschine wird durch einige Angaben von Flügge (P 15) charakterisiert. Selbst unter der Annahme, daß nur ein Prozent des Urans in der Maschine "verbrennt", werden je Gramm Uran $6 \cdot 10^5$ KWs frei, d.h. mit 30 t Uran könnte die gesamte Leistung der Reichselektrowerke ($1929 = 7 \cdot 10^5$ KW) ein Jahr lang aufgebracht werden. Wie günstig "Urammaschinen" als Energiequellen für Fahrzeuge sein würden, ergibt sich aus den gleichen Berechnungen, wonach z.B. ein Kreuzer bei einer angenommenen Leistung von 10^5 PS mit einer Anlage von 4 t Uran rund ein Jahr lang mit Energie versorgt werden könnte. Dabei würde unter der gestellten Voraussetzung nur ein sehr geringer Teil verbraucht werden.

Da die Maschine mit natürlichem Uran eine bestimmte Minimalgröße haben muß, die vorerst mit einigen Tonnen angenommen wird, scheint ihre Anwendung unter Benutzung des natürlichen Isotopengemisches für Flugzeuge und kleinere Fahrzeuge noch nicht möglich, wohl aber für stationäre Anlagen des Heeres, der Wehrmacht im allgemeinen und der Industrie, sowie für Schiffe und größere Tanks ; beim Gelingen einer Verschiebung der Isotopenverhältnisse zugunsten des U_{235} dagegen auch für gewöhnliche

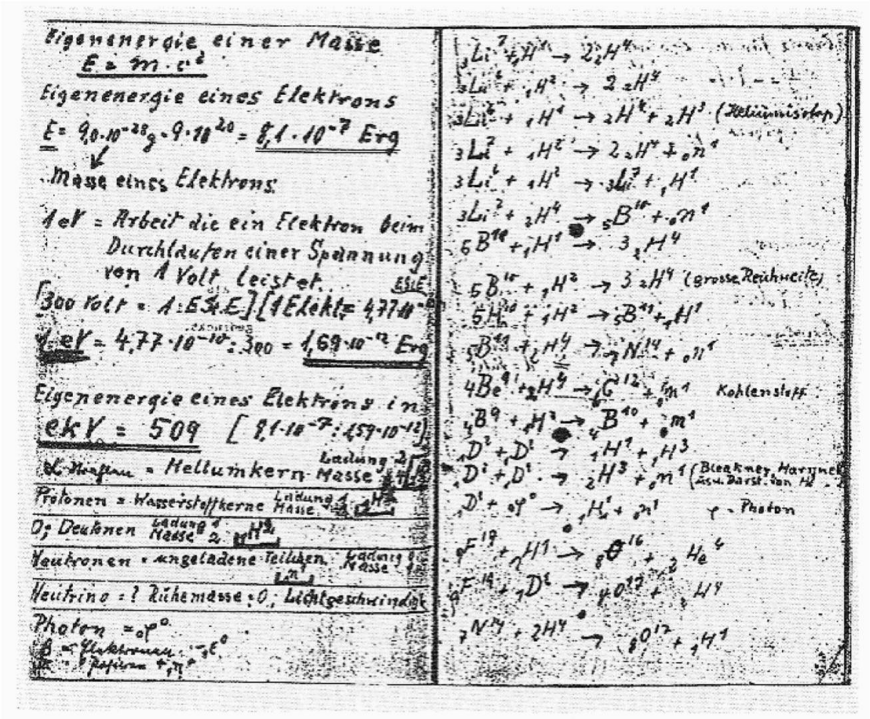
Kraftfahrzeuge und Flugzeuge. Die Anwendung für R-Geräte darf dabei nicht außer Betracht bleiben.

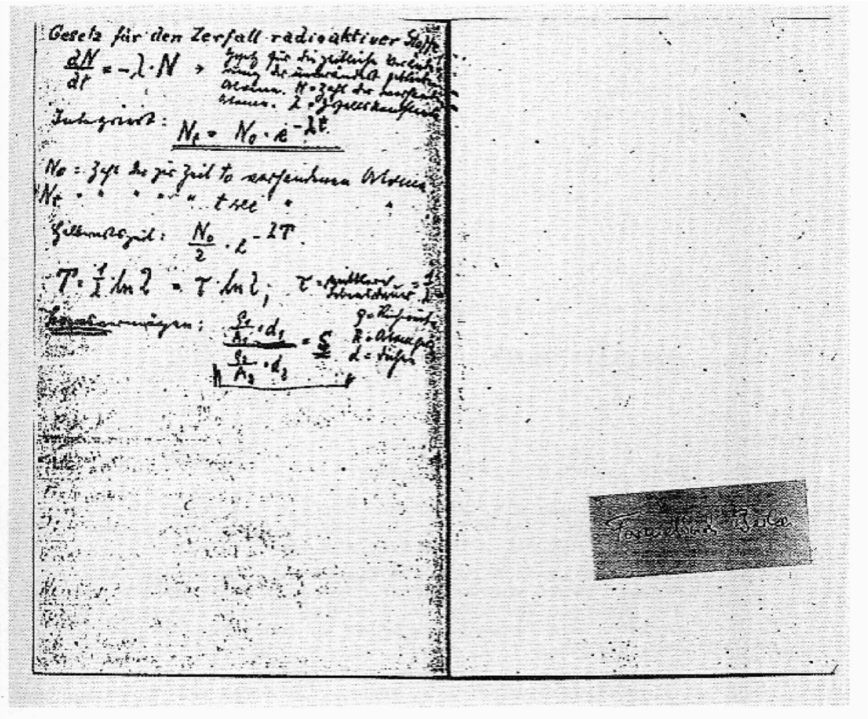
Eine solche Uranmaschine erzeugt weiter Strahlungsintensitäten, die bisher völlig unerreichbar sind. Man könnte damit auch gewissermaßen als "Abfallprodukt" künstlich radioaktive Substanzen, z.B. für die Radiumtherapie in größeren Mengen herstellen. Besonders wichtig wäre es, wie schon in Kapitel I ausgeführt, das in einer "Maschine" entstehende Element 94 chemisch abzutrennen und zur Herstellung wesentlich kleiner dimensionierter Anordnungen zu verwenden. Mit diesem Element 94 würden sich dann auch (ohne Trennung der Uranisotope) "Kernsprengstoffe" herstellen lassen, deren Wirkung die der bisher bekannten Sprengstoffe um viele 10-er Potenzen übertrifft.

Die Bedeutung für die Anwendung ist nach diesen kurzen Hinweisen nicht erschöpft, es geht aber schon daraus hervor, wie notwendig eine intensive Fortführung der Arbeiten ist. So muß der schon erwähnte halbtechnische Versuch das Ziel haben, baldmöglichst eine arbeitende Uranmaschine zu erstellen, um noch offene Fragen zu klären und über die zweckmäßigste Dimensionierung technischer Anordnungen zu entscheiden. Dieser klar vorgezeichnete Weg erfordert, nachdem die auf dieses Ziel ausgerichteten vordringlichsten wissenschaftlichen Probleme als gelöst gelten können, einen bedeutenden Einsatz von Mitteln und vor allem von eingearbeiteten Mitarbeitern, deren Sicherstellung auch in der Industrie unbedingt erforderlich ist. Wenn alle Voraussetzungen gegeben sind, muß die großtechnische Erzeugung von Schwerem Wasser weiter vorangetrieben und insbesondere die Herstellung von kompaktem Uranmetall noch mehr intensiviert werden.

Über die Möglichkeiten der Herstellung von "Kernsprengstoffen" kann erst nach Anlaufen der ersten Uranmaschine bezw. nach erfolgter Isotopentrennung in technischem Ausmaße entschieden werden. Vorläufig sind im Hinblick darauf noch viele Vorarbeiten zu leisten.

Document III





Document IV

Reg. Baurat Dr. Diebner
Kaiser-Wilhelm-Institut
für Physik

Berlin-Dahlem, den 10.11.44
Boltzmannstr. 20
Tel.: 763244/45

Herrn
Prof. Dr. W. Heisenberg

Urfeld/Oberbayern
bei Kochel

Sehr geehrter Herr Professor!

Unser Versuch mit Wasser und Würfeln ist jetzt so weit fortgeschritten, daß wir an die Auswertung denken können. Hierzu brauchen wir allerdings dringend Ihre Hilfe.

Die Werte im äusseren Raum liegen gut, im inneren haben wir dagegen recht beträchtliche Streuung. Wir führen dieses auf die geringen Abstände und die sich daraus ergebene Schwierigkeit, die Indikatoren innen an denselben Stellen anzubringen, zurück.

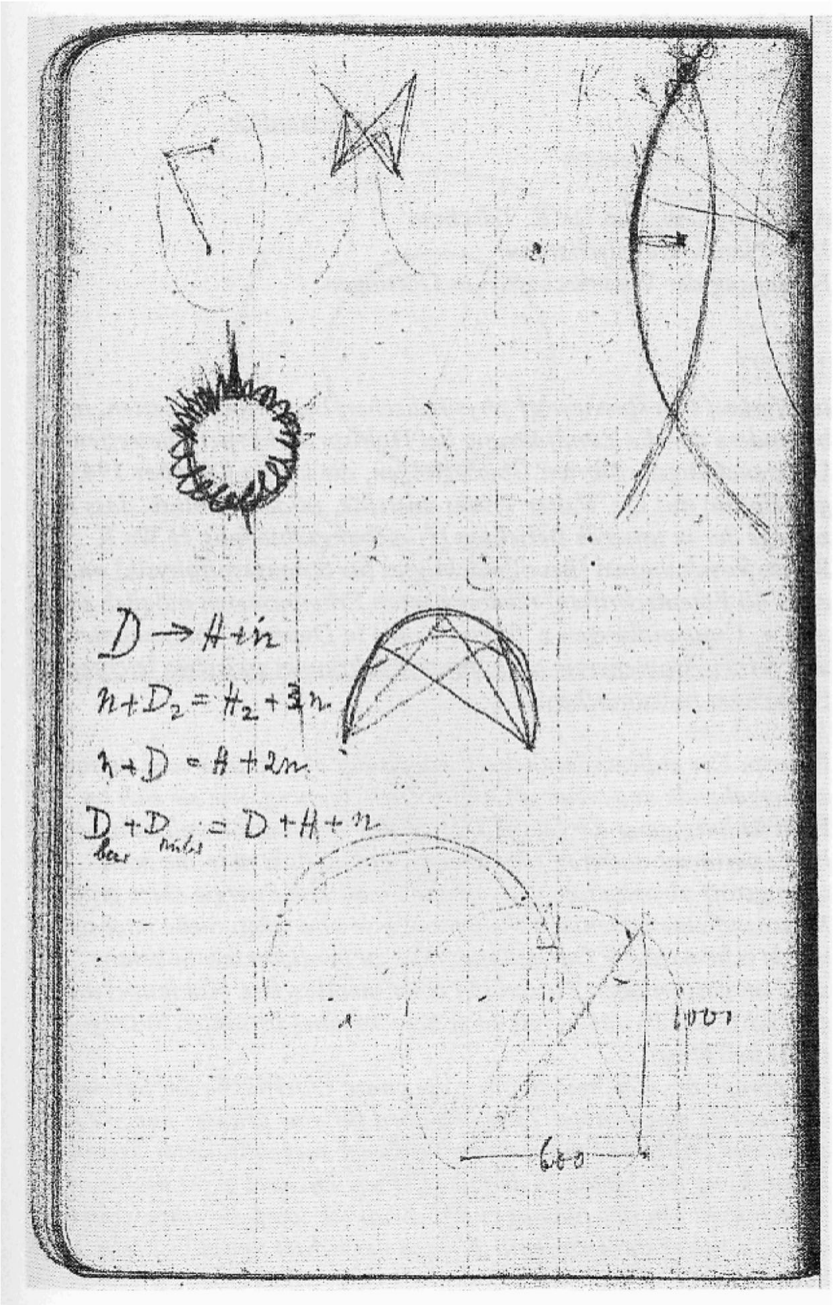
Wir haben die Anordnung mit 520 Würfeln ausgeführt, die kugelsymetrisch angebracht wurden. Da durch das Versetzen der Würfel am Rande Stufen entstanden, wissen wir auch nicht genau, wie man am zweckmässigsten die Integrationsgrenze legt.

Auch sonst ergeben sich noch viele Fragen, die wir gern mit Ihnen besprochen hätten.

Ich hörte, daß Sie in einigen Tagen in Berlin erwartet werden Sollte sich Ihr Kommen noch verzögern, so wäre ich Ihnen dankbar, wenn Sie uns mitteilen könnten, wann und wo wir Ihnen über unsere bisherigen Versuche berichten können.

Mit ergebenem Gruß

Heil Hitler!



Document VI

prof Dr. Erich Schumann

Goettingen, the 2. Apr 48

Confidential

To Mr. Gen. Dir. dr E
Telschow Max Planck Society
promotion of sciences in

Goettingen

in the In the course of explosives-physical research work, in particular
the investigation of the detonation of hollow explosives

Walter Trinks hired, to the conclusion that, it
according to Explosives Reports [and Czech Department Representative for

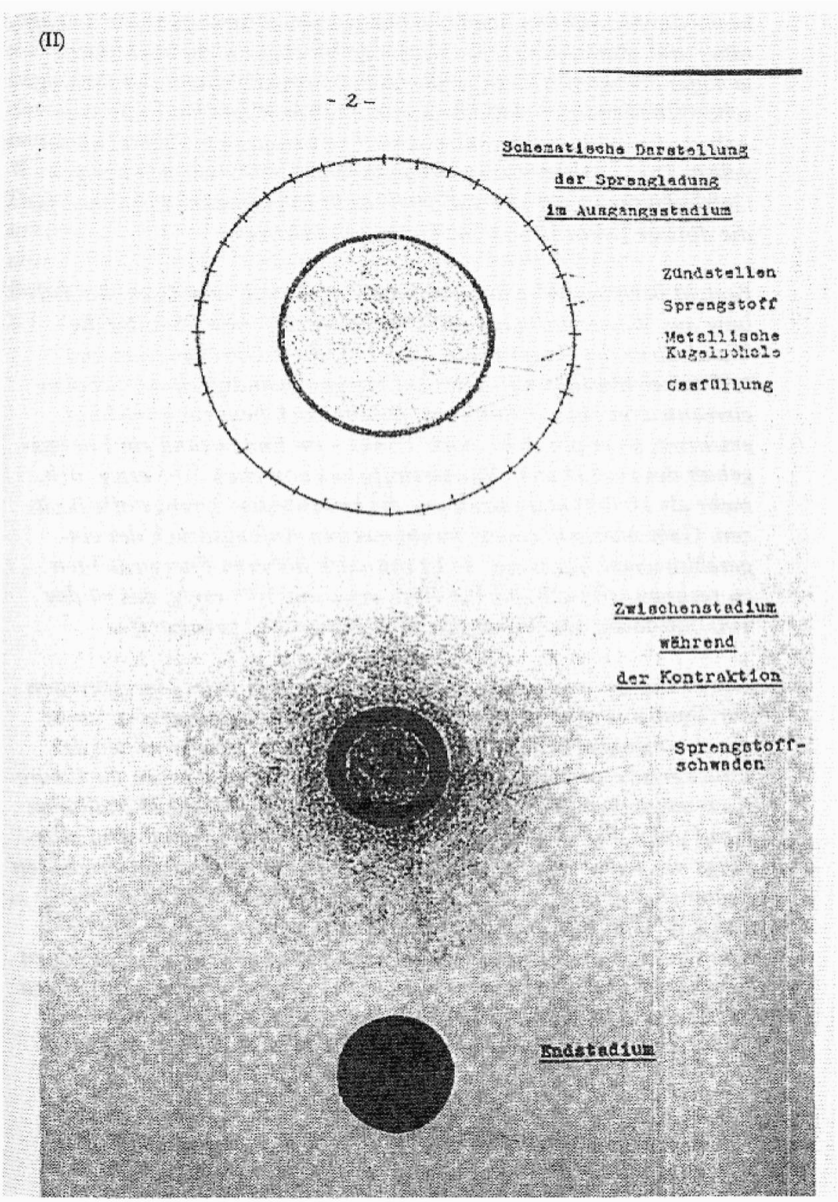
Patent specifications] laid down findings may be possible 40
to release transformations from coal to diamond e.g.
and further atomic energy also through reactions between light elements.

Principle: The extraordinary compression of matter and the
associated tremendous increase in temperature, as it occurs in the
stars as a result of gravitational energy, is
schematic below. (The substance to be compacted is

gaseous state in a metallic hollow sphere
brought, which is covered on the outside with a layer of explosive
explosives.
With a suitable, evenly over the entire surface of the explosive layer
initiated ignition high pressure is exerted on the metal

(II)

- 2 -



Document VI

It was no longer possible in 1944/45, the already prepared Ver
to carry out a search, because the then Ministry of Armaments and
Munitions did not support such experiments and even banned them. At
that time, however, the experimental possibilities and theoretical considerations were laid down in a written work. In accordance with instructions,
this work was destroyed with the other secret files in 1945 and in 1947, Drink in a Dr.
after consultation with you, for the authorities there intended to use his habilitation thesis

dr Drinks reconstructed.

If, for example, the spherical shell mentioned is made of iron, the
filling of hydrogen gas about 1/50 of its diameter. At this thickness, the spherical shell is about the initial pressure, the calculates
with an initial speed of the shell elements of about 3200 m/sec.
According to Trinks, the energy content of the
compressed hydrogen gas in the final state is about g/g, that is 1000 times
as much as the most explosive explosives have. If one assumes a
reduced initial pressure of the enclosed gas, the achievable energy density would be expected, 1016 erg/
g, which is 0.1,100,000 times that for the most explosive explosives. 1015 he

value

Due to extremely increasing radiation losses when the temperature
limit of the non-degenerate electron gas is exceeded, as well as exceeding the pressure that is technically possible in the individual cases, the theoretical values (temperatures of
10-100 million degrees and pressures of 100 billion to 500, million atm) can
only be approximately achieved. However, the available data indicate that a temperature of about 10 million degrees can be achieved
at a pressure of about

further increase to about million 10
sufficient, can be expected. billion atm, which is at least 10
the state in
But then at least the two deuteron reactions are

$$^{2}D + {}^{2}D = {}^{3}Hey + {}^{1}n$$

$$^{2}D + {}^{2}D = {}^{3}Tr + {}^{1}H,$$

Their insertion in course of development of stars already at 200000°* sufficiently probable** for somewhat short times, so they too the which are available in the planned hollow sphere process (about 0.001 sec), take place significantly more that can be obtained

can become e.g. B. ½ Will cubic meters (approx. 9 heavy hydrogen gas from g) Pressure 0.1 Atm. Fully reacted according to the above reaction equations approximately 275 trillion. Amounts can be obtained using other light elements, lithium or. energy amount of around corresponding erg. free. 1019 Even significantly higher

e.g. Boron,

Eric Schumann

---

* See Bethe and Marshak, Rep. on Progr. in Phys. 6:1-15:1939.
** Proven in the main report Sect. V, p. 36 using the theoretical relations of Aktinson and Houtermans improved by Gamow and Teller (Phys. Rev. (2) 53, 608,1938), the calculations by Bethe (Phys. Rev. (2) 55,434,1939), as well as the experimental values of the cross section of the deuteron reactions by Ladenburg and Kanner (Phys. Rev. (2) 52,911,1937) and the measurements by Burhop (Proc. Phil. Soc. 32, 643,1936).).

Document VII

Совершенно секретно

(особой важности)

-1-

РАССЕКРЕЧЕНО

Отзыв о материале под заголовком

„О немецкой атомной бомбе"

Материал исключительно интересен.

Он содержит описание конструкции немецкой атомной бомбы, предназначенной к транспортировке на ракетном двигателе типа „Фау".

Перевод урана 235 через критическую массу, которая необходима для развития цепного атомного процесса, производится в описываемой конструкции взрывом, окружающей уран 235, смеси порошка тринитротолуола и жидкого кислорода.

Запал урана осуществляется быстрыми нейтронами, генерируемыми при помощи высоковольтной разрядной трубки, питаемой от специальных генераторов.

Для защиты от тепловых нейтронов футляр с ураном окружается слоем кадмия.

Все эти детали конструкции бомбы

Здравоохранение ~~и советская наука~~, ~~которые у нас кладутся в основу проектирования атомной бомбы~~.

Надо отметить, что на основании ознакомления с материалами у меня не осталось полной уверенности, что немцы действительно делали опыты с атомной бомбой. Эффект разрушения от атомной бомбы должен быть большим, чем указано, и распространяться на несколько километров, а не сотен метров. Опыты, о которых идет речь в материалах, могли быть предварительными и делались на конструкциях, предназначенных для атомных бомб, но без снаряжения ее ураном 235.

Желательно получить дополнительные сведения о ходе опытов, которые бы помогли уяснить положение с ураном 235.

Document VII

Некоторые моменты, являющиеся, судя по описанию, весьма существенными для действия атомной бомбы, остаются для меня неясными.

К ним относятся: 1) предварительное, подготовительное действие на уран гамма-лучей с энергией не больше 6 миллионов электрон-вольт, 2) указание, что на разрушение урана 235 весьма благоприятно действуют радиоактивный элемент 93, который получается из урана облучением нейтронами.

Трудно себе представить, что какое-либо из этих воздействий гамма-лучей или нейтронов могло существенным образом изменить взрывные свойства урана 235. Только при большой интенсивности этого облучения при помощи атомных котлов, можно заметно изменить свойства урана 235. Скорее здесь речь может идти о тонкостях начала взрывного

— 4 —

процесса, базирующихся на каких-то новых физических данных по процессу взаимодействия нейтронов с атомными ядрами урана.

Было бы исключительно важно получить по этим вопросам более подробную и точную информацию.

Еще более важно было бы знать подробности о процессе извлечения урана 235 из обычного урана.

Сверх перечня отметить, что было бы исключительно важно провести беседу нашего физика с лицом, давшим рецензируемую информацию.

И. Курчатов

30 марта 1945 г.

Экз. единый

Копия направлена т. Ильичеву ЗI/Ш-45г. за № сос.см.расписку.

Напечатано в 1 экз.
ля – к.№16186

Document VII

Statement IV of Kurchatov on documents "About a German Atomic Bomb"1 received from the HVA of the Red Army General Staff

30

March 1945 »Secret classified information«

(Strictly confidential)

The material is extremely interesting. It contains the construction description of a German atomic bomb, transport with a rocket propulsion system of the type The combination of uranium-235, which is which is necessary to bring about an atomic chain reaction, causes the explosion of a mixture of granulated uranium-235 trinitrotoluene.

To protect against the hot neutrons, the uranium container is surrounded by a cadmium layer. All of these design details are very credible.3 It must be noted that, based on the material I have read, I am not entirely convinced that the German bomb tests actually planning atomic

have taken.

The degree of destruction from an atomic bomb would have to be greater than stated and spread over several kilometers and not just a few hundred meters. There

without a uranium-235 warhead. It would be desirable. additional information about the process

of experiments to be able to make a more precise localization and to obtain a sample of uranium-235.

A few aspects which, judging by the description, very convincingly demonstrate the effect of an atomic bomb remain unclear to me. These include: 1) the preliminary irradiation of uranium with Gam ma-rays, their energy potential million electron volts 6

does not exceed; 2) the indication that the radioactive element 93, which is obtained from uranium by irradiation with neutrons, has an extremely positive effect on the decay of uranium-235.

It is hard to imagine that any form of gamma ray or neutron development could significantly alter the explosive properties of uranium-235 at high nuclear boilers one can notice the properties of uranium-235 Talk more about specific details about Be

lily change. Here is the

beginning of the work on the physical factors in the action of neutrons on the atomic nuclei of uranium. would be extremely important to see more

---

There information to get.

It would be even more important. Learn about the process of extracting uranium-235 from natural uranium.

I consider it necessary to point out that our one physicist's conversation provided the information reviewed here would be extremely important.

Kurchatov I

30

March 1945 only copy

(Note:) Copy sent to Gen. Ilyichev with distributor. No. 3GVS – s. A vase

1 Original title of the document. These are findings of the secret service, which the HVA of the General Staff sent in a letter dated March 28, 1945 under registration no. 436347-GVS (5 sheets), the previous letter was sent on December 5, 1944.

2 Kurchatov refers here to the GRU report of March 23, 1945.

3 The following has been deleted: and agree with those on which our atomic bomb project is based.

Remarks

FOREWORD

1 Cf. Richard Rhodes, The Los Alamos Primer, Berkeley 1992.
2 Cf. Ramer, Karlsch, Zbynek Zeman, Uraneheimisse. The Ore Mountains in Focal point of world politics 1933-1960, Berlin 2003.
3 Minutes of the 1962 interrogation of Heinz Wachsmut by the Arnstadt District Council, a working group of the SED district leadership and the working group of the Castle and Local History Museum, local history museum Veste Wachsenburg (Holzhausen). A copy of the protocol is available in the district archive of Arnstadt.
4 Conversation between Hitler and Antonescu on August 5, 1944 in: Andreas Hillgruber (ed.), statesmen and diplomats under Hitler. Confidential records of conversations with representatives from abroad 1942-1944, Frankfurt/M. 1970, Vol. 2, p. 484.
5 Quoted from: Matthias Schmidt, Albert Speer. The end of a myth. The uncovering of his falsification of history. Speer's true role in the Third Reich, Bern, Munich 1982, p. 9.
6 Quoted from: Felix Kersten, Samtel med Himmler. Minnen Fran Tredje Riket 1939-1945, Stockholm 1947, pp. 279f.
7 Cf. Friedemann Needy, When Hitler built the atomic bomb. Lies and errors about the "Third Reich", Munich 2003.
8 Leslie R. Groves, Now I May Speak, Cologne 1965, p. 192.
9 Cf. Samuel Goudsmit, Alsos, New York 1947; Bons T. Pash, The Alsos Mission, New York 1969.
10 Quoted from: Thomas Powers, Heisenberg's War. The Secret Story of the German atomic bomb, Hamburg 1993, p. 506.
11 See Francis H. Hinsley, British Intelligence in the Second World War: lts Influence on Strategy and Operations, Vol. 3, London 1984, pp. 931-943.
12 Cf. Charles Frank (ed.), Operation Epsilon: The Farm Hall Transcripts, Bristol, Philadelphia 1993; Dieter Hoffmann (ed.), Operation Epsilon. The Farm Hall Protocols or The Allies' Fear of the German Atomic Bomb, Berlin 1993; Jeremy Bernstein, Hitler's Uranium Club. The Secret Recordings at Farm Hall, Woodbury 1996.
13 Cf. the description of the disputes in: Mark Walker, Die Uranmaschine. Myth and reality of the German atomic bomb, Berlin 1990, p. 243ff.
14 Cf. Walther Bothe, Siegfried Flügge (eds.), Nuclear physics and cosmic Rays, Weinheim 1948.
15 Cf. Robert Jungk, Brighter than a thousand suns, Bern 1956.
16 Cf. David Irving, Der Traum von der Deutschen Atombombe, Gütersloh 1967. Irving had built up a reputation over many years as an expert on the military history of the Third Reich. From the 1980s,

he was increasingly involved in the mass murder of European Jews and mutated into a Holocaust denier.

17 Cf. Mark Walker, Die Uranmaschine, Berlin 1990; Monika Renneberg, Mark Walker (ed.), Science, Technology and National Socialism, Cambridge 1994; Mark Walker, Nazi Science. Myth, Truth, and the German Atomic Bomb, New York 1995.

18 These documents were first available in the Niels Bohr Library of the American Institute of Physics in New York. Today they can also be seen in the Deutsches Museum in Munich and in the nuclear research center in Karlsruhe.

19 Cf. Robert Jungk, foreword, in: Mark Walker, Die Uranmaschine, Berlin 1990, p. 7ff.

20 Cf. Thomas Powers, Heisenbergs Krieg, Hamburg 1993. The best Hei senberg biography: David C. Cassidy, Uncertainty. The Life and Science of Werner Heisenberg, New York 1992.

21 Cf. Paul L. Rose, Heisenberg and the Nazi Atomic Bomb Project, Berkeley, Los Angeles, London 1998.

22 Cf. Michael Frayn, Copenhagen. Play in two acts, Göttingen 2001.

23 Cf. Philip Henshall, The Nuclear Axis. Germany, Japan and the Atom Bomb Race, London 2000.

24 One of the originators of such conspiracy theories was the Viennese patent lawyer Friedrich Lachner. His ideas were allegedly adopted by an SS research group. At the end of the war, several bombs are said to have fallen into the hands of the Americans near Amstetten. Lachner concluded: »The atomic bombs dropped on Japan were German bombs.« (Cf. Friedrich Lachner, On the history of the atomic bomb, Vienna, oJ). Wilhelm Landig, a leading representative of Nazi esotericism, argued similarly.

25 Harald Fath was the first to come up with the thesis of an underground "nuclear factory" in Thuringia. Apart from statements and a few remarks on the history of the uranium project, which are simply characterized by ignorance, Fath is unable to substantiate his thesis of a "German Manhattan Project" in the Thuringian underground. (Cf. Harald Fath, 1945 – Thüringens Manhattan Projekt, Schleusingen 1998; the same, Secret command matter – S III. Jonastal und die Siegswaffe Production, Schleusingen 1999) It is not worth going into this in more detail, because he has no evidence to offer for his central thesis . All other publications on this topic by Thomas Mehner were also able to do this books nothing to change. (See Thomas Mehner, The Secret of the German Atomic Bomb, Rottenburg 2001; Thomas Mehner, The Atomic Bomb and the Third Reich, Rottenburg 2002). They are based on testimonies of contemporary witnesses and the analysis of the local conditions, against which there is nothing to be said. However, both authors disregard even the simplest rules of source criticism, which inevitably leads to exaggerations and false conclusions.

26 Leader order of January 11, 1940, archive of the MPG, KWI for Physics, folder 9.

27 Cf. Matthias Uhl, Henrik Eberle, Das Buch Hitler, Berlin 2005.

28 excerpts from the statements by Hans Baur from 19/20. December 1945, GARF Moscow, 9401/1/550, Bl. 106.

29 This is referred to by Henry Picker, Hitlers Tischgesprach im Führerhauptquartier 1941-1942, ed. by Percy Ernst Schramm, Stuttgart 1963.

30 Interview with Ms. Guderian-Fehlberg on May 15, 2003 in Berlin.

31 Cf. Walther Gerlach service calendar, March 22, 1945, Deutsches Museum Munich.

32 Quoted from: Peter Hayes, Degussa in the Third Reich. From cooperation to complicity, Munich 2004, p. 227.

33 Unnecessarily, strange letters about the March events, apparently crudely forged, surfaced in 2001/2002, which did not prevent some authors from claiming that they contained testimonies from key witnesses. These are mainly letters allegedly written by Reichspost employee Hans Rittermann. The man actually existed, but the origin of the letters is more than doubtful.

34 Cf. letter from Remdt and Wedel to the Central Committee of the SED dated March 30, 1965 "Lübke and the Führer Headquarters", BStU Erfurt, Allg. S, No. 123.

35 Cf. Dieter indicator, Hitler's last refuge? The project for a Führer headquarters in Thuringia 1944/45, Munich 2003, p. 186.

36 See, inter alia, Remdt, Wendel: »Secret object S III, the concentration in the Thuringia and the resulting conclusions« October 6, 1965, BStU Erfurt, Allg. S, No. 123, Bl. 86ff.

37 Cf. Central Committee Department 62, information on the research activities of Comrades Remdt and Wendel on the problems of the former planned Fuehrer Headquarters "Olga" from January 18, 1967, BStU Berlin, HA IX/11, AV //85, Vol. 40.

38 "Research Center of the Reich Ministry Stadtilm (School)", report of July 8, 1966, BStU branch office in Erfurt.

39 Cf. Arnstadt district office, final report of May 6, 1968, BStU, Erfurt branch office.

40 Cf. Pavel V. Oleymkov, German Scientists in the Soviet Atomic Project, in: The Nonproliferation Review, Summer 2000.

41 Cf. Raisa V. Kuznetsova, Natalya Seleznjova, Trevozhny Kolokol Georgij Flerov (The Alarm Bells of Georgij Flerov), in: Kurchatov Institute (ed.), The History of the Atomic Project, Moscow 1998.

42 Cf. LD Rjabev (ed.), Atomnij Projekt CCP (The Soviet Atompro ject 1938-1945), second half volume, Moscow 2002.

43 See letter from Dr. Matthias Uhl (Institute for Contemporary History Munich) dated November 29, 2004 to the author.

44 Cf. Erich Schumann: "The truth about the German work and proposals on the atomic energy problem (1939-45)", unpublished manuscript 1949, Erich Schumann estate. The bundle of research reports, official documents and letters was entrusted to me by Herbert Kunz (Brunswick) in December 2004; it will shortly be handed over to the military archive of the Federal Archives.

45 See letter from Schumann to Winkhaus dated July 21, 1950, Nachlass Eric Schumann.

46 Erich Schumann: »The Truth«, Bl. 38.

First part: THE GERMAN URANIUM PROJECT

1 Willhem Hanle, Memoiren, Gießen 1989, p. 78.
2 Quoted from: Mark Walker, Uranmaschine, p. 30.
3 See Harold Furth, Atomic Bomb Scientists Memoirs 1939-1945, West port 1967, p. 97, quoted in: Jeremy Bernstein, Hitler's Uranium Club. The secret recordings at Farm Hall, Woodbury, New York 1996, p. VIII.
4 Cf. Mark Walker, Uranmaschine, p. 30.
5 On Esau's biography, see: Ulrich Kern, research and precision measurement. The Physical-Technical Reichsanstalt between 1918 and 1948, Weinheim 1994; pp. 259ff; Dieter Hoffmann, Rüdiger Stutz, border crossers of science. Abraham Esau as an industrial physicist, university rector and research manager, in: Uwe Hoßfeld, et al. (ed.), Kampfische Wissenschaft. Studies on the University of Jena under National Socialism, Cologne 2003.
6 See David Irving, The Dream, p. 35. It is not entirely clear whether other physicists attended this first meeting. Helmut Rechenberg, Transuranium, uranium fission and the German uranium project, Physikalische Blatter 44 (1988), p. 454, and Klaus Hentschel (ed.), Physics and National Socialism. An Anthology of Primary Sources, Basel 1996, also mentions Peter Debye, Robert Dopel, and Wolfgang Gentner as participants, without giving any evidence.

7 Cf. report by Paul Rosbaud of August 5, 1945, Samuel A. Goudsmit Papers, Folder 42, Box 28, Niels Bohr Library, American Institute of Physics.
8 Cf. Burghard Ciesla, Das HWA und die KWG, Manuscript Berlin 2004.
9 Cf. Hans Ebert, Hermann Joseph Ruhpieper, Technical Science and National Socialist Armaments Policy: The Defense Technology Faculty of the TH Berlin 1933-1945, in: Reinhard Rürup (ed.), Science and Society. Contributions to the history of the TU Berlin 1879-1979, Berlin 1979; Burghard Ciesla, farewell to »pure« science. Defense technology and applied research in the Prussian Academy after 1933, in: Wolfram Fischer (ed.), The Prussian Academy of Sciences in Berlin, Berlin 2000, pp. 483-511; Werner Luck, Erich Schumann and the HWA student company. A contemporary witness report, in: Dresden Contributions to the History of Technical Sciences No. 27, 2001.

10 Cf. BArch, Berlin-Lichterfelde, A 0530 Erich Schumann (January 5, 1898); Estate of Erich Schumann, personnel documents.
11 See interview with Claus Christian Cobarg on January 12, 2004.
12 Cf. Helmut J. Fischer, Hitler and the Atomic Bomb. Report of a contemporary witness, Asendorf 1988, p. 25.
13 See Die Naturwissenschaften 27 (1939), pp. 402-410.
14 Cf. Werner Holtz, The Uranium Atomic Nuclear Fission, March 5, 1949 (with Additions by Richard Glagow from 1968) in: Federal Archives, Military Archives (BA-MA) Freiburg, Nachlass General Erich Schneider N 625/4; File Glagow.

15 Conversation with Prof. Dr. Jörg Diebner on September 9th, 2003 in Hoxter.
16 Cf. Kurt Diebner, Erich Bagge, Kenneth Jay, From uranium fission to Calder Hall, Hamburg 1957, p. 21.

17 Werner Czulius, report for a Soviet commission of November 29, 1945, Archive of the MPG, no. 19207.

18 Cf. Mark Walker, Uranmaschine, p. 58ff.

19 Quoted from: Michael Salewski, The Age of the Bomb. The history of the nuclear threat from Hiroshima to the present day, Munich 1995, p. 31.

20 Cf. Erich Bagge, The Leipzig Experiments on the Release of Nuclear Energy (1939-1942), in: Christian Kleint, Gerald Wiemers (ed.), Werner Heisenberg in Leipzig 1927-1942, Berlin 1993, p. 21.

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22 Cf. Michael Schaaf, The physical chemist Paul Harteck, 1902-1985, dissertation, University of Stuttgart 1999.

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25 Cf. Erwin Respondek, overview of the status of the scientific Work in Germany on the atomic bomb (until May 1945), Annex 1, NA Washington, RG 226, Entry: 210, Box 465.

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27 Cf. on the history of the PTR: J. Bortfeld, W. Hauser, H. Rechenberg (eds.), 100 years of the Physikalisch-Technische Reichsanstalt/Bundesanstalt 1887-1987, Berlin 1987; David Cahan, Master of Measurement. Die Physikalisch-Technische Reichsanstalt, Berlin 1992; Ulrich Kern, Research and Precision Measurement. The Physical-Technical Reichsanstalt between 1918 and 1948, Berlin 1993.

28 Cf. protocol of the questioning of Dr. Weiss, October 28, 1945, MPG archive, Diebner Group, no. 19208.

29 Cf. Ulrich Schmidt-Rohr, The German Particle Accelerator, p. 2.

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31 Conversation with Prof. Willibald Jentschke on October 31, 1965, Deutsches Museum Munich, Irving Papers, 31595.

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Report on the II. Physics Institute, currently in Thumersbach near Zell am See, July 1, 1945, Deutsches Museum Munich.

33 Information from the archives of the University of Innsbruck from December 16, 2002.

34 Cf. David Irving, The Dream, p. 48.

35 Cf. Werner Heisenberg, The possibility of technical energy production from uranium fission, G-39, Deutsches Museum Munich.

36 Cf. Werner Heisenberg, report on the possibility of technical energy production from uranium fission (II), G-40, Deutsches Museum Munich.

37 See David C. Cassidy, Uncertainty. The Life and Science of Werner Heisenberg, New York 1992, pp. 423f.

38 Quoted from: Mark Walker, Uranmaschine, p. 35.

39 Cf. memo dated March 1, 1940, archive of the MPG, KWI for Physics, No. 9; Helmut Rechenberg, Werner Heisenberg and the research program of the Kaiser Wilhelm Institute for Physics (1940-1948), in: Bernhard von Brocke, Hubert Laitko (eds.), The Kaiser Wilhelm/Max Planck Society and its institutes , Berlin, New York 1996, pp. 245-263.

40 Cf. Federal Archives (BArch) Berlin-Lichterfelde, former Berlin document Center (BDC), #0518.

41 Quoted from: Dieter Hoffmann, Operation Epsilon. The Farm Hall Protocols or the Allies' Fear of the German Atomic Bomb, Berlin 1993, p. 342.

42 See memorial report by Werner Czulius (without reference to documents) October 1945, MPG archive, no. 19207.

43 Cf. Gunter Nagel, Nuclear Tests in Germany, Zella-Mehlis 2002, p. 39ff.; An American investigative report of September 5, 1945, NA Washington, 498-249-69, offers a good overview of the activities of the HWA.

44 Cf. Günter Nagel, Atomversuche, p. 47, as well as the schemata structures of the HWA (as of spring 1944).

45 Cf. report by Werner Czulius from December 1945, archive of the MPG, KWI for Physics, unsigned.

46 Cf. BArch Berlin-Lichterfelde, BDC, PK 1000, No. A 300.

47 After the end of the war, Czulius had to write several reports about his activities in Gottow for the Soviet occupation authorities. In it he disclosed only part of his knowledge. See report by Werner Czulius from December 1945, archive of the MPG, KWI for Physics, unsigned.

48 Cf. Journal of Astrophysics, Vol. 17, H. 3/5.

49 Cf. letter from the archive of the Berlin-Brandenburg Academy of Sciences of February 13, 1998 to Gunter Nagel. I thank Mr. Nagel for pointing this out.

50 See Prof. Rexer's report of December 14, 1956, Federal Commissioner for the Records of the State Security Service of the former GDR (BStU), Central Archive, AP, No. 1498/59.

51 Cf. Gunter Nagel, Nuclear Tests, p. 61.

52 Cf. BArch Berlin-Lichterfelde, BDC, Karl-Heinz Hocker, No. A 0494.

53 Cf. www.LexikonderWehrmacht.de, Register of Persons. And Hans Jürgen Witthoft, Encyclopedia of German Naval History, Herford, 1978.

54 Cf. Karl Witzell, The importance of science and research for the development of naval ordnance (1944), n.c

55 Cf. Erich Schumann, »The Truth«, Part I, Bl. 21a.

56 Cf. activity report of the FEP office group for 1943 (Wilhelm Rhein), BA-MA Freiburg, RM 7, No. 174; Walter Lohmann, Hans H. Hildebrand, The German Navy 1939-1945, Bad Nauheim 1956ff., Vol. III, personal details. Four departments were subordinate to the office group: General Research Control (Ministerialrat Dr. Erich Buchmann), Research Organization and Reporting (Prof. Dr. Werner Osenberg/from August 1944 Dr. Erich Buchmann), Research (Prof. Dr. Helmut Hasse) and Invention and patents (Frigattenkapitän Hans Roeder/from August 1944 Dipl.-Ing. Huss).

Applied mathematical research in Germany, with particular reference to naval applications, BIOS report no. 79, p. 46f. Later, Hasse also supported the research of Prof. Wigge from the Neukrug test site near Swinemünde on remote control of rockets using high frequency and infrared. In 1945, the British rated Hasse as an “incorrigible Nazi”. His right to teach was revoked, after which he left the British zone in 1946 and initially took up a position at the Berlin Academy and

1949 at the Humboldt University in Berlin. Just one year later he went to Hamburg and taught mathematics at the university there until 1966. (Cf. University of Hamburg website, 2004.)

57 Cf. Heinrich Becker, Hans-Joachim Dahms, Cornelia Wegeler (eds.), The University of Göttingen under National Socialism, Munich 1998, pp. 538f.

58 Cf. Chemical-Physical Research Institute of the Navy, CIOS Report XXIII-II of May 29, 1945; Chemical-Physical Research Institute of the Navy, BIOS Report 1210, October 1945.

59 Cf. Dieter Hoffmann, Pascual Jordan in the Third Reich – Highlights, Berlin 2003; Norton Wise, Pascual Jordans Quantum Mechanics, Psychology, National Socialism, in: Monika Renneberg, Mark Walker (eds.), Science, Technology and National Socialism (Cambridge 1994), pp. 224-254.

60 Cf. Pascual Jordan, Die anschauliche Quantentheorie, Berlin 1936; Pas Cual Jordan, The Physics and the Secret of Organic Life, Berlin 1941; Letter from Jordan to Rosbaud dated September 30, 1941, Jordan estate no. 765, Berlin State Library.

61 Cf. Edoardo Amaldi, The adventurous life of Friedrich Georg Houter mans, physicist (1903-1966), typescript based on Fritz Houtermans' "Chronological account of my life in Russian prisons", May 1945.

62 Cf. VS Frenkel, Professor Fritz Houtermans, Arbeit, Leben und Schick sal, Moscow 1997 (Russian), pp. 90f.

63 See note from Heinrich Müller, BStU Berlin, FV 98/66, vol. 82: Houtermans.

64 Cf. Arnold Kramish, The Griffin. Paul Rosbaud - the man who Hitlers nuclear plans failed, Munich 1987, p. 123.

65 Cf. Gestapo file and curriculum vitae: Houtermans, BStU Berlin, FV 98/66, vol. 82: Houtermans.

66 Cf. CV of Otto Haxel dated May 31, 1946, Freiburg University Archives, B 15, no. 296; Arthur Scharmann, In memory of Otto Haxel. by call; Ulrich Schmidt-Rohr, The German Nuclear Physics Laboratories, Heidelberg 2003, p. 44ff.

67 Cf. Thomas Powers, Heisenbergs Krieg, p. 135f.
68 Cf. Deutsches Museum Munich, G-37; G-56; G-91; G-116; G-117; G-118 69
Conversation with Ilse Haxel on March 4, 2004.
70 Otto Haxel, How I experienced the emergence of the physics of atomic nuclei, in: OM Marx, A. Moses (ed.), Emeriti remember, vol. 2, Weinheim 1993, pp. 63-95.

71 Cf. Thomas Powers, Heisenbergs Krieg, p. 447.
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73 Gerd R. Ueberschär, The German Reichspost 1933-1945. A Political Administrative History, Vol. II; Wolfgang Lotz, The German Reichspost 1933-1945. A history of political administration. Selected documents, Koblenz 2002.
74 Cf. Herbert Leclerc: Dr. Without care and the German Reichspost, in: Archive for German Postal History, H. 2/1988, pp. 120-150.
75 Cf. Thomas Stange, The Nuclear Physics Ambitions of the Reich Post Minister Ohnesorge, in: Reports on the History of Science 21 (1998), pp. 159-174.

76 Cf. Manfred von Ardenne, Sixty Years for Research and Progress, Autobiography, Berlin 1988, pp. 89ff.; Manfred von Ardenne, I met them, Düsseldorf 1997, p. 117ff.
77 Cf. Thomas Stange, The Genesis of the Institute for High Energy Physics of the German Academy of Sciences in Berlin (1940-1970), Leipzig 2000, p. 10.

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Letter from Heisenberg dated June 12, 1942, Archive of the MPG, KWI for Physics, No. 29, Bl. 356ff.)
79 Cf. Henry Picker, Hitler's Table Talks, p. 531.
80 Cf. Ferdinand Trendelenburg, From the history of research at Siemens, Düsseldorf 1975; Wilfried Feldenkirchen, Siemens 1918-1945, Munich 1995; Maria Osietzki, Nuclear physics large devices between scientific research, industry and politics. On the development of the first German particle accelerator at Siemens 1935-1945, in: History of Technology, Vol. 55, 1988, No. 1.

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91 Cf. Heinrich Kahlert, chemist under Hitler, Economy, Technology and Science of German chemistry from 1914 to 1945, Langwaden 2001, p. 444.

92 Cf. Arnold Kramish, Der Greif, p. 110ff.
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95 See letter from Heinz Pose to Gustav Hertz dated January 9, 1939, Siemens Archive Munich, 11 LG 43 Flir, folder 2.
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rien, p. 73.
100 Report on the business trip to Paris, which was carried out by Messrs. H. Watzlawek and H. Schüller on behalf of Henschel-Flugzeug-Werke, Department F, between June 14 and 20, 1941, library of the German Museum in Munich.

101 Cf. G-60, Deutsches Museum Munich.
102 Cf. G-58, G-60, Deutsches Museum Munich.
103 Cf. Karl-Heinz Roth, A specialist company for combustion cycles, p. 24.

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Second part: REACTOR EXPERIMENTS

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3 Cf. Joseph Schintlmeister, E. Hernegger, About a hitherto unknown, alpha-emitting chemical element, June 1940; Joseph Schintlmeister, The position of the element with alpha rays of 1.8 cm range in the periodic table; Joseph Schintlmeister, Further chemical studies on the element with alpha rays with a range of 1.8 cm, G-55, Deutsches Museum Munich.

4 Carl Friedrich von Weizsäcker, Short report on the possible practical impact of the uranium tests based on a consultation with Dr. Diebner (undated, probably 1941), Archive of the MPG, KWI for Physics, No. 56.

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10 See, for example, David C. Cassidy, Uncertainity. The Life and Science of Werner Heisenberg, New York 1992; Michael Neufeld, The Rocket and the Reich, Berlin 1995.

11 letters from Dr. Erich Hohne to Werner Heisenberg on September 9, 1947, quoted from: Wolfgang D. Muller, History of Nuclear Energy in the Federal Republic of Germany, Stuttgart 1990, p. 29f.

12 Cf. Werner Heisenberg, The part and the whole, p. 246.

13 Quoted from: Thomas Powers, Heisenbergs Krieg, Hamburg 1993, p. 153.

14 Cf. Robert Jungk, Brighter than a thousand suns, p. 95.

15 On January 20, 1987, Ardenne sent this report again to the Noch living physicist of the Uranium Association, just as if he wanted to help her remember.

16 Cf. Heinrich Kahlert, Chemiker unter Hitler, p. 449f.

17 Cf. Thomas Powers, Heisenbergs Krieg, p. 144ff.

18 Cf. Paul O. Muller, Condition for the Use of Uranium as an Explosive, G-50, Deutsches Museum Munich.

19 Cf. Draft of a letter to the Reich Patent Office dated March 11, 1941, Archive of the MPG, KWI for Physics, No. 29.

20 Cf. patent claims (undated), Archive of the MPG, KWI for Physics, No. 29. The patent was filed under file number R 110 520 VI/40c g. Rs. [Geheime Reichssache] registered and comprised seven claims.

21 Cf. draft of a letter to the Reich Patent Office dated March 11, 1941, Archive of the MPG, KWI for Physics, No. 29.

22 ibid.

23 ibid.

24 Carl Friedrich von Weizsäcker, Energy production from the uranium isotope of mass 238 and other heavy elements (production and use of element 94), Archive of the MPG, KWI for Physics, No. 7, Pu.

25 ibid.

26 ibid.

27 Four years later, while in British internment, Wirtz mentioned this patent specification: “One shouldn’t forget that the Kaiser Wilhelm Institute for Physics had a patent for the manufacture of such a bomb. This patent was granted in 1941«, quoted from: Dieter Hoffmann (ed.), Operation Epsilon, p. 175. At the time, Wirtz's reference was ignored.

28 Cf. Interview with Carl Friedrich von Weizsäcker, in: ibid., p. 338ff.

29 Cf. German secret reports on the utilization of nuclear energy from the years 1939-1942. Paul L. Rose speculates that this writing also contains references to the reactor bomb. That's not the case. This idea was included in the first draft of the patent application from early 1941, but was then abandoned.

30 Cf. HWA letter to Wirtz dated May 28, 1943, archive of the MPG, KWI for Physics No. 7.

31 Quoted from: David Irving, The Dream, p. 102.

32 Werner Heisenberg, The part and the whole, p. 246f.

33 Cf. Helmut Rechenberg, Werner Heisenberg. German and Jewish Physics, Munich, Zurich 1992, p. 164.

34 Cf. Werner Heisenberg, The active and passive opposition in the Third Reich, November 12, 1947, archive of the MPI Munich.

35 The best description of the background to Heisenberg's numerous journeys can be found in: Mark Walker, Nazi Science. Myth, truth, and the German atomic bomb, New York 1995, pp. 153ff.

36 Cf. ibid., p. 144ff.

37 Cf. Michael Frayn, Copenhagen. Stuck in two acts, Göttingen 2001.

38 Cf. Paul L. Rose, S. Heisenberg, p. 154ff.

39 Quoted from: Robert Jungk, Brighter than a thousand suns, p. 81.

40 Cf. Mark Walker, Nazi Science, p. 153ff.

41 Quoted from: Robert Jungk, Brighter than a thousand suns, p. 71.

42 Quoted from: John Cornwell, Research for the Führer, Bergisch-Gladbach 2004, p. 350f.

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44 Cf. Karl Wirtz, In the Surroundings of Physics, Karlsruhe 1988, p. 52.

45 Cf. Michael Schaaf, Paul Harteck, p. 128.

46 Cf. letter from Norsk Hydro to Karl Wirtz dated February 21, 1941, Archive of the MPG, KWI for Physics, No. 29.

47 Cf. Mark Walker, Uranmaschine, p. 48.

48 Cf. Hertz an von Buol June 24, 1941, Siemens archive Munich, 11 LG 43 Fhr, folder 2.

49 Cf. Michael Eckert, Maria Ossietzki, Science for Power and Market, p. 52.

50 Cf. Dr. Schleicher: Note from December 1, 1941: Sequence of cyclotron manufacture, Siemens archive Munich, 11 LG 43 Flir, folder 2.

51 ibid.

52 Note from December 1, 1941, ibid.

53 Cf. Mark Walker, Uranmaschine, p. 63ff.

54 Cf. Erich Schumann: »The Truth«, Bl. 19, Erich Schumann estate.

55 Cf. Joachim Fest, Speer. A biography, Berlin 1999.

56 Quoted from: Heinrich Kahlert, Chemiker unter Hitler, p. 453.

57 Erich Schumann, »The Truth«, Bl. 20, Erich Schumann estate.

58 Quoted from: Thomas Powers, Heisenbergs Krieg, p. 197.

59 At the turn of the year 1941/42, the Luftwaffe reported its interest in the uranium problem to the head of the HWA, General Leeb, and asked for his participation. The Commander-in-Chief of the Navy, Admiral Dönitz, sent General Admiral Witzell to Leeb to discuss the project for nuclear-powered ships and submarines. (Cf. Erich Schumann, »The Truth«, p. 21f.)

60 Joseph Goebbels, diaries from the years 1942-1943, Zurich 1948, p. 136.

61 Cf. HWA report of February 1942, Hechingen city archive.

62 Ibid., p. 5.

63 Ibid., p. 10.

64 Ibid., pp. 16f.

65 Cf. David Irving, The Dream, pp. 122f.

66 Cf. Karl-Heinz Ludwig, Technology and Engineers in the Third Reich, Düsseldorf 1974, p. 240.

67 Cf. David Irving, The Dream, p. 123 claimed that Heisenberg on the

June Conference also referred to the Protactinium as a third way.
However, there is no such reference in Heisenberg's speech manuscript.

68 After the conference, Heisenberg sent a copy of his presentation to Hermann Göring, Archive of the MPG, KWI for Physics, No. 54.

69 Cf. Werner Heisenberg, The work on the uranium problem. Lecture given on June 4, 1942 in the Harnack House of the KWG (1st of 2 copies), Archive of the MPG, KWI for Physics No. 56, Bl. 174-178.

70 The “pineapple comparison”, which was later much quoted, was first mentioned in a letter from Heisenberg to Goudsmit on October 3, 1948 (cf. Goudsmit papers, American Institute of Physics). In 1965, Heisenberg repeated his comparison in conversation with David Irving (cf. David Irving, The Dream, p. 123). Ernst Telschow and Erich Bagge confirmed the statement to Armin Hermann (cf. Armin Hermann, Heisenberg, p. 71ff.)
Because there is no written record of the discussion, some historians remain skeptical about the "pineapple comparison."

71 Cf. Karl Wirtz, In Radius of Physics, Karlsruhe 1988, pp. 38f., 56; Paul L. Rose, Heisenberg, p. 43.

72 HWA report from February 1942, p. 13.

73 Otto Haxel, On the possibility of a chain reaction with fast neutrons, in: Walther Bothe, Siegfried Flügge (ed.), Nuclear Physics and Cosmic Rays, Wiesbaden 1948, p. 113.

74 Cf. Dieter Hoffmann (ed.), Operation Epsilon, p. 148.

75 Ibid., p. 217.

76 Why did the Uranium Association and the HWA have an approximate idea of the critical mass of a plutonium bomb and why, on the other hand, nothing was said, at least officially, about the critical mass of a U235 bomb? Otto Hahn said several times that you only need very little U235 for a bomb. He had learned this from Heisenberg and Weizsäcker. Nevertheless, this had no consequences for the uranium project.
Russian physicists claim that they have German calculations of the critical mass. Unfortunately, this could not be checked so far.
Thanks to Mark Walker for pointing this out.
From the construction plan for an implosion bomb (see part 4) you can see that this should work with the U235. The unknown authors must have at least approximately calculated the critical mass.

77 Cf. Christian Kleint, Gerald Wiemers (ed.), Werner Heisenberg in Leipzig 1927-1942, Berlin 1993.

78 See note of March 19, 1942: From the Speer-Ohnesorge correspondence dr Vogler on the cyclotron issue, ibid. In addition to the cyclotron, the Reichspost in Miersdorf also planned to build two high-voltage systems. One was commissioned from CHF Muller in Hamburg in early 1941, the other from Siemens.

79 Cf. Thomas Stange, The Genesis of the Institute for High Energy Physics, p. 17.

80 Cf. Manfred von Ardenne, Sixty Years, p. 162. We only know about this conversation from Ardenne's memoirs. Whether the conversation actually went that way is disputed.

81 Cf. ibid., p. 163.
82 Cf. Manfred von Ardenne, About a new magnetic isotope separator for high mass transport, Berlin-Tempelhof, April 12, 1942. We are grateful to Mr. Alexander von Ardenne for kindly providing a copy of the report.

83 Cf. Berger's handwritten note dated May 21, 1942, BArch Berlin Lichterfelde, NS 19/2012, sheet 1.
84 Quoted from: Manfred von Ardenne, Sixty Years for Research and Fort step, Leipzig 1988, p. 162.
85 Schumann dates this conversation to February 26, 1942, but he does not can vote, because carelessness only on 09.06. was with Hitler and the multiplication of neutrons in the Leipzig experiment only became known on June 18, 1942.
86 Erich Schumann, »The Truth«, Erich Schumann Estate, B1.19f.
87 ibid., p. 20ff.
88 Conversation with Erich Bagge, Deutsches Museum Munich, Irving Paper, 29350.
89 Erich Bagge, Kurt Diebner, Kenneth Jay, From Uranium Fission to Calder Hall, Hamburg 1957, p. 28.
90 Cf. Willy A. Boelcke, Germany's Armaments in World War II: Hitler's Conferences with Albert Speer 1942-1945, Frankfurt/M. 1969, p. 137.
91 Cf. letter from Heisenberg to Vogler dated December 11, 1942, Archive of the MPG, KWI for Physics, No. 54.
92 Cf. Manfred von Ardenne, Sixty Years, p. 162.
93 Letter from SS-Gruppenfuhrer Berger to Himmler of September 8th 1942, BArch Berlin-Lichterfelde, NS 19/2012, sheet 2.
94 Cf. letter to the editor by Hans Meckel, »Die Welt« of June 5, 1991. Confirmation that Hans Meckel belonged to the scientific management staff of the Navy can be found in a list of invitations to the meeting of this staff on April 10, 1945, BArch Berlin-Lichterfelde, R 26 III, No. 746.
95 Cf. letter from Werner Heisenberg to the Executive Board of the KWG dated May 20, 1943, archive of the MPG, KWI for Physics, folder 54.

96 Cf. Mark Walker, Uranmaschine, p. 78f.
97 Cf. circular letter from Esau to all senior members of the Uranium Association dated March 19, 1943, archive of the MPG, KWI for Physics, No. 37.
98 Memorial report by Werner Czulius (without the aid of documents), October 1945, MPG archive, no. 19207.
99 Cf. letter from Bothe to Heisenberg dated June 30, 1942, Archive of the MPG, KWI for Physics, No. 7.
100 Cf. letter from Heisenberg to Bothe dated July 9, 1942, Archive of the MPG, KWI for Physics, No. 7.
101 Interview with Nikolaus Riehl on April 1, 1966, Deutsches Museum Munich, Irving Paper, 31607ff.
102 Cf. Thomas Powers, Heisenbergs Krieg, p. 444f.
103 Cf. Mark Walker, Uranmaschine, p. 120f.
104 Prof. Joliot-Curie a shining example, in: Hamburger Volkszeitung of May 4, 1950.

Remarks

105 Diebner acted as a representative of the HWA for the Paris Institute and claimed a pension allowance after the war "because of his work as a civil servant in the operational area". (Letter from Diebner to Gerlach dated May 19, 1952, Walther Gerlach estate, Deutsches Museum Munich).

106 Cf. G-125, Deutsches Museum Munich.

107 Cf. G-218, G221, G-222, Deutsches Museum Munich.

108 Cf. Hans Westmeyer, About an experiment with uranium and D2O, MPG archive, no. 19207.

109 Minutes of the meeting on July 24th and 25th, 1942 in Rjukan and Vemork, Archive of the MPG, KWI for Physics, No. 29.

110 See letter from Butefisch to Harteck dated April 20, 1942, G-341/1, Deutsches Museum Munich.

111 Cf. Mark Walker, Uranmaschine, p. 102f.

112 Cf. ibid., p. 149.

113 Cf. Per F. Dahl, Heavy Water, p. 234.

114 Cf. Francis H. Hinsley, British Intelligence in the Second World War, Its influence on strategy and operations, Vol. 2, London 1984, p. 126.

115 Cf. letter from Heisenberg to Vogler dated February 9, 1944, Archive of the MPG, KWI for Physics, No. 23c2.

116 Cf. Minutes of the discussion on May 7, 1943 in the PTR, ibid.

117 Cf. memo re: SH 200, visit of Mr. Diebner on August 2, 1943 in Leuna, Harteck papers, no. 0269, Deutsches Museum Munich.

118 Cf. Harteck: Report on the visit to Montecatini in Meran May 27, 1943, ibid.

119 See telegram from Gebchem Berkin to Herold of August 3, 1943, ibid.

120 Cf. main laboratory, memorandum on the meeting in Leuna on September 28, 1943, ibid.

121 Report on the meeting in Berlin on September 27, 1943 and on September 28, 1943 in Leuna, ibid.

122 Cf. Esau's transcript of the meeting on May 7, 1943, Archive of the MPG, KWI for Physics, No. 56.

123 Cf. letter from Esau to Heisenberg of May 29, 1943, archive of the MPG, KWI for Physics, No. 7.

124 Cf. Heisenberg to Esau of June 4, 1943, ibid.

125 ibid.

126 Cf. letter from Heisenberg to Vogler dated June 1, 1943, MPG archive, KWI for Physics, No. 56.

127 Cf. David Irving, The Dream, pp. 194f.

128 Cf. letter from Heisenberg to Esau dated July 30, 1943, Archive of the MPG, KWI for Physics, No. 56.

129 Cf. Mark Walker, Uranmaschine, p. 154.

130 Cf. Mark Walker, Uranmaschine, p. 130. The account of Cassidy, Uncertainty, p. 458, that Heisenberg was only behind schedule with the Berlin reactor experiments because the production of the metallic uranium plates was so complicated, misses the essence of the problem.

131 Cf. Helmuth Rechenberg, Walther Gerlach. biographical sketch, Internet.

132 Cf. Invitation to the General Meeting of the Scientific Management Staff of the Navy of March 23, 1945, BArch Berlin-Lichterfelde, R 26 III, No. 746.

133 Cf. letter from Ms. Fehlberg-Guderian of June 20, 1999.
134 Letter from Max von Laue to Otto Hahn from 1946, archive of the MPG, Abt. in, Rep. 14A, no. 2462.
135 Cf. Thomas Powers, Heisenbergs Krieg, p. 446ff.
136 Cited in: Mark Walker, Uranmaschine, p. 161.
137 See letter from Gerlach to Mentzel dated May 30, 1944, NARA Washington, College Park, Box 16, Folder Alsos RFR 103 H. I would like to thank Stefan Brauburger (ZDF) for pointing this source out.
138 Cf. Mark Walker, Uranmaschine, p. 161.
139 Cf. ibid., p. 206.
140 Cf. memo re: SH 200, visit of Mr. Diebner on August 2, 1943 in Leuna, Harteck papers, no. 0269, Deutsches Museum Munich.
141 Cf. Anker Olsen, Norsk Hydro Gjenom 50 Aar, Oslo 1953, p. 421.
142 Letter from Heisenberg to Vogler dated February 9, 1944, archive of the MPG, KWI for Physics, no. 23c2.
143 See Heinrich Kahlert, Chemiker unter Hitler, p. 526.
144 Cf. Karl Wirtz, In the Surroundings of Physics, p. 53; Letter from Schoepke Harteck from October 30, 1951.
145 Cf. Per F. Dahl, Heavy Water, p. 232. 146
Rough estimate: if there were 607 liters in 49 barrels on the ferry calculated at 100 percent concentration, then there were still around 200 liters in the 23 barrels.

147 Cf. work calendar Walther Gerlach, Deutsches Museum Munich.
148 Cf. David Irving, The Dream, p. 236.
149 Letter from Wirtz to Bormann dated September 26, 1944, Archive of the MPG, KWI for Physics, No. 29.
150 Cf. David Irving, The Dream, pp. 247f.
151 Cf. Jomar Brun, Focus Vemork: 1940-1945, Oslo 1985.
152 Cf. Mark Walker, Uranmaschine, p. 175.
153 Cf. Anker Olsen, Norsk Hydro Gjenom 50 Aar, Oslo 1953, p. 422.
154 The Reichsbahner Wilhelm Kaper, like numerous other citizens, was questioned by the Interior Department of the Arnstadt District Council about what was happening in Arnstadt during the war. He mentioned two wagons that had stood at Arnstadt station for two months because there was a lack of special lifting technology. After the appearance of "big shots" from the Reich Research Council, the wagons were unloaded and the plant components were taken to the Central German plant in Arnstadt and later to Stadtilm. (See the protocol of the interrogation of Wilhelm Kaper by the Arnstadt district council, a working group of the SED district leadership and the working group of the Castle and Local History Museum [Holzhausen], May 1962. The holdings of this museum were closed in the 1960s. Some of the interview protocols came into the district archive of Arnstadt.

Kaper's time statement is wrong. The high concentration plant did not come to Stadtilm at the end of 1943, but only at the end of 1944.)
155 Cf. G 341/1, Deutsches Museum Munich.

Remarks

156 Cf. Karl-Hermann Geib, handwritten notes of October 21, 1945 for a Russian commission, archive of the MPG, file no. 19207.

157 ibid.

158 Cf. letter from Wirtz to Gerlach dated November 11, 1944, Archive of the MPG, KWI for Physics, No. 29.

159 Cf. Wolfgang D. Muller, History of Nuclear Energy, p. 30; Hellmuth J. Fischer, Hitler and the Atomic Bomb, p. 99

160 Cf. report on the neutron multiplication of an arrangement by Uranium cubes and heavy water (GIII), G-210, Deutsches Museum Munich.

161 Letter from Heisenberg to Gerlach dated February 15, 1944, MPG archive, KWI for Physics, No. 7.

162 Erich Bagge, Kurt Diebner, Kenneth Jay, From Uranium Fission to Calder Hall, p. 41.

163 Interview with Friedwardt Winterberg on September 23, 2004 in Konstanz.

164 See letter from Heisenberg to Wirtz dated March 18, 1944, MPG archive, KWI for Physics, No. 29.

165 Dieter Hoffmann (ed.), Operation Epsilon, p. 157.

166 See letter from Heisenberg to Vogler of April 3, 1944, MPG archive, KWI for Physics, No. 29.

167 Cf. Mark Walker, Uranmaschine, p. 162f.

168 Cf. Lilli Peltzer, The dismantling of German scientific and technical intelligence after the Second World War. Die Physikalisch-Technische Reichsanstalt 1945-1948, Berlin 1995, p. 47f.

169 Cf. The information about the production of metallic uranium and thorium by Degussa and the Auergesellschaft between 1939 and 1945 varies in the sources. While Degussa's business books only show a production of 5.5 tons of uranium metal for the Frankfurt works (cf. Peter Hayes, Degussa, p. 230), Nikolaus Riehl explained that around ten tons of metallic uranium and ten tons of various uranium preparations were made. (Interrogation of Nikolaus Riehl by a Soviet commission on June 15, 1945, MPG archive). Production Director Dr. Volckel told the Americans that a total of more than fourteen tons of metallic uranium and 13.2 tons of thorium were produced. (Cf. The production of Thorium and Uranium in Germany, BIOS Final Report 675, Item 21; 1.).

170 Cf. communication: Special metal relocation Rheinsberg, January 20, 1945, Archive of the MPG, KWI for Physics, No. 62.

171 The small company Mollenhauer and Kemper from Potsdam-Babelsberg, which was responsible for the mechanical processing of the uranium, was also relocated to Thuringia. She came to Schmölln near Altenburg together with the department for construction of measuring devices of the Auergesellschaft. Professor Max Volmer's laboratory was already there (cf. minutes by Dr. Zimmer, November 1945, MPG archive, no. 19208).

172 Cf. memorandum Dr. Bärwind on a discussion with Dr. duke, dr Klaenhardt, Dr. Völkel on January 18, 1945 in Berlin-Grünau, Archive of the MPG, KWI for Physics, No. 63; protocol dr Zimmer, November 1945, MPG archive, no. 19208.

173 Cf. report by Siegfried Hülsmann of November 4, 1945, archive of the MPG, No. 19207.

174 Cf. letter from Schlottau to the Jenaer Glaswerke of August 2, 1944, archive of the MPG, KWI for Physics, no. 23c.

175 Cf. Archive of the MPG, HA I, Rep. 11, PA Rehbein, No. 308.

176 Cf. Günter Nagel, Nuclear Tests, p. 128.

177 Cf. letter from Gerlach to Telschow dated September 20, 1944, archive of the MPG, I. Abt, Rep. 1 A, No. 203/2.

178 Cf. letter from the Reich Defense Commissioner for Thuringia dated February 17, 1945, no. 23 c, archive of the MPG, KWI for Physics, no. 23 c.

179 See report of March 17, 1945: back-up facility for special metal and thorium, archive of the MPG, KWI for Physics, No. 65 D.

180 The material was available in Stadtilm at the beginning of 1945: around a ton of metallic uranium, around four hundred liters of heavy water and four grams of radium. A photographic laboratory, two complete measuring devices and a manual library were also set up.
See Friedrich Berkei, Georg Hartwig, report on the work carried out in Germany on the production of nuclear energy, archive of the MPG, Austria 2, p. 291ff.

181 Cf. Günter Nagel, Nuclear Tests, p. 129.

182 Friedrich Berkei, Georg Hartwig, Report on the work carried out in Germany on the production of nuclear energy, Archive of the MPG, Austria 2, Bl. 291ff.

183 Cf. Gerhard Remdt, Günter Wermusch, Puzzle Jonastal, p. 126f.

184 Cf. conversation with Prof. Dr. Jörg Diebner in Flensburg September 15, 2003.

185 Cf. work calendar Walther Gerlach, Deutsches Museum Munich.

186 Cf. letter from Gerlach to Heisenberg dated October 30, 1944, Archive of the MPG, KWI for Physics, No. 7.

187 See letter from Wirtz to Heisenberg of January 26, 1945, ibid.

188 Cf. Mark Walker, Uranmaschine, p. 178.

189 Cf. work calendar Walther Gerlach, Deutsches Museum Munich.

190 Cf. Dieter Hoffmann (ed.), Operation Epsilon, p. 160.

191 Walther Gerlach, Nuclear Physics Research from July 1 to September 30, 1944, BArch Berlin-Lichterfelde, R 26, III, No. 280.

192 Cf. letter from Gerlach to Heisenberg dated October 30, 1944, archive of the MPG, KWI for Physics, file no. 7.

193 Cf. Dieter Hoffmann (ed.), Operation Epsilon, p. 150.

194 Cf. HWA report of February 1942, Haigerloch town archive.

195 Cf. letter from Vogler to Heisenberg dated July 28, 1943, archive of MPG, KWI for Physics, No. 56, Bl. 76.

196 Cf. Heinz Ewald, A new method for magnetic isotope separation of May 3, 1942, in: G-139; Wilhelm Walcher, report on the status of the mass spectroscopic work carried out in Kiel, in: G-196; David Irving, The Dream, p. 120.

197 Cf. minutes of the conversation with Wilhelm Walcher of May 8, 2003 and of 11/21/2003.

198 Cf. Minutes of conversation with Wilhelm Walcher of July 24, 2002.

199 See letter from Heisenberg to Kopfermann dated April 9, 1943, archive

MPG, KWI for Physics, No. 54, Bl. 142; Report on the progress of work at the KWI for Physics from June 26, 1944, archive of the MPG, KWI for Physics, No. 56, Bl. 82.

200 Cf. Gerlach diary, entries for March/April 1944; see Dieter Hoff mann (ed.), Operation Epsilon, p. 166.

201 Cf. Harteck to Gerlach of July 13, 1944, Harteck Papers No. 0271, Deutsches Museum Munich.

202 The first isotope lock built by the Bamag-Meguin company was hit by a direct bomb at the end of 1943. As a result, a new device was built at an alternative site in Butzbach in Upper Hesse. Diebner sent Berkei, Beyerle, Siebert and Herr and Frau Rehbein to Butzbach as reinforcements. A six-day trial began on August 10, 1944. The result of the endurance test was 2.5 grams of highly enriched UF6.
In a second endurance test, Bagge's isotope lock got stuck. The device was dismantled and taken to the backup location of the KWI for Physics in Hechingen. The isotope lock was set up in a room in the Grotz laundry factory, as was a similar apparatus designed by Korsching. See the diary of Erich Bagge, Deutsches Museum Munich, Irving Paper, 29141.

203 Cf. Walther Bothe, Siegried Flügge, Natural Science and Medicine in Germany 1939-1946, Issues 13 and 14, Wiesbaden 1947, pp. 189 ff.

204 Quoted from: Hans-Friedrich Stumpf, Kernenergieforschung in Celle, Celle 1995, p. 27. Cf. also: Mark Walker, Uranmaschine, p. 103.

205 What was revolutionary about the UZ III A was the coupling of two centrifuges, each with five chambers. Here the heavy gas in each chamber accumulated at the outer edge and the lighter gas in the middle. As long as both centrifuges rotated at the same speed, there was no gas transport between the chambers. Therefore, the rotational speed of a centrifuge was changed periodically. The effect of this "rocking process" was that the brief difference in speed caused a sudden drop in pressure. As a result, the gas was pushed into the adjacent chamber, causing the heavier and lighter isotopes to separate. (Cf. Konrad Beyerle, Wilhelm Groth, Paul Harteck, Johannes Jensen, About Gas Centrifuges, Chemical Engineering Technology Jg. 1949, No. 17/18, pp. 331-334.)

206 Cf. David Irving, The Dream, p. 134.

207 Cf. Hans-Friedrich Stumpf, Nuclear Energy Research in Celle, p. 28.

208 Cf. David Irving, The Dream, p. 134.

209 See letter from Esau to Harteck of July 15, 1943; Letter from Harteck to Esau dated July 21, 1943, G-341-4, Deutsches Museum Munich 210 Letter from Paul Harteck to Abraham Esau dated July 21, 1943, G-341-4, German Museum Munich.

211 Cf. Walther Gerlach notebook February 15 - May 5, 1944, Deutsches Museum Munich, NL 080/270-67.

212 Cf. Paul Harteck, notes of May 23, 1944, G 341-2; Letter from Harteck to Esau dated December 15, 1943, G 341-4, Deutsches Museum Munich.

213 Cf. Helmut J. Fischer, recollections, part II, 1985, pp. 125ff.; the same, Hitler and the Atomic Bomb, p. 22.

214 Cf. letter from Otto Hahn to Karl Witzell dated May 4, 1943, MPG archive, Otto Hahn estate, Dept. III, Rep. 14 A, No. 4763.

215 Cf. Jörg Friedrich, Der Brand, Berlin 2003, p. 115.

216 Letter from Harteck to Esau dated December 15, 1943, G 341-4, Deutsches Museum Munich, G-341.

217 Quoted from: Hans-Friedrich Stumpf, Kernenergieforschung in Celle, p. 32.

218 Cf. Mark Walker, Uranmaschine, p. 179f.

219 Cf. G-342, Deutsches Museum Munich.

220 See letter from Harteck to Gerlach of February 7, 1945, G 341-4, Deutsches Museum Munich; Mark Walker, Uranium Machine, p. 181.

221 Cf. Hans-Friedrich Stumpf, nuclear energy research in Celle 1944/45, pp. 93-94.

222 Konrad Beyerle, Wilhelm Groth, Paul Harteck, Johannes Jensen, About gas centrifuges, Chemical Engineering Technology, 1949, No. 17/18, p. 334.

223 See Erich Bagge, Kurt Diebner, Kenneth Jay, From uranium fission to Calder Hall, Hamburg 1957, p. 37.

224 Cf. Walter Bothe, Siegfried Flügge (eds.), Physics and cosmic rays. Natural research and medicine in Germany 1939-1946, vol. 14, Weinheim 1948, pp. 99f.; Manfred von Ardenne, memories, Berlin 1987, p. 162.

225 Cf. Manfred von Ardenne, About a new magnetic isotope trenner for high mass transport, Berlin April 12, 1942; about an ion source system with a mass monochromator for neutron generators, in: Physical Journal 1942, Issue 5/6, pp. 91-101.

226 Cf. Thomas Stange, Institute X., The Beginnings of Nuclear and High Energy Physics in the GDR, Stuttgart 2000, p. 22.

227 Cf. University Archives of the Humboldt University in Berlin, HUB PA after 1945: Detlof Lyons.

228 Cf. Detolf Lyons, Report on the Velocity Distribution and the Spatial Distribution of Fast Neutrons in Paraffin, Deutsches Museum Munich, G-233.

229 Cf. BArch Berlin-Lichterfelde, R 47.01 (RPM), no. 20827, p. 154f.

230 See letter from Harteck to Diebner of April 14, 1943, Deutsches Museum Munich, G-341/4.

231 Cf. Secret Reich matter, Re: Formation of a military research community schaft, BStU, RHE 25/87 SU, Vol. 81.

232 Cf. Thomas Stange, Institute X., p. 27.

233 Cf. Grailer Report of August 25, 1945, Museum for Communication Berlin.

234 We thank Dr. Alexander von Ardenne for kindly forwarding the previously unknown research report.

235 There is evidence that the facilities continued to be used by the Soviet Army for a number of years after 1945. This is supported by the protection of the systems, which can still be seen today, including a warning sign of »radioactivity« inside.

236 Conversation with Prof. Dr. Ulrich Schmidt-Rohr on October 26, 2004 in Heidelberg.

237 Interview with Friedwardt Winterberg on September 23, 2004 in Konstanz.

238 Cf. Werner Czulius, report for a Soviet commission dated November 29, 1945, MPG archive, no. 19207. Only further chemical analyzes can clarify whether heavy paraffin was actually used in G IV. These could not be provided as part of our project.

239 Cf. Karl-Heinz Hocker, manuscript of January 25, 1943, University Archives Stuttgart, Hocker estate no. 31.

240 Cf. letter from Prof. Dr. Reinhard Brandt of June 2004 to Ver barrel.

241 See Kurt Diebner, Erich Bagge, Two-stage nuclear reactor, German Patent Office, Examination 1058643 (September 15, 1955); Kurt Diebner, Erich Bagge, Nuclear Reactor, German Patent Office, Auslegeschrift 1020127 (September 22, 1955).

242 Cf. letter from Kurt Diebner to Werner Heisenberg dated November 10, 1944, archive of the MPG, KWI for Physics, folder 5-1.

243 Cf. Karl-Heinz Hocker, Analysis of the cube experiment with U3O8 in paraffin in the Gottow research institute (undated), Stuttgart University Archives, SN 30/23. Since the report is not a description of the first Gottow experiment (GI) and its explanations also do not fit GII or G III, it can only mean a later experiment, namely GIV.

244 ibid.

245 Letter from Vogler to Heisenberg dated October 31, 1944, Archive of the MPG, KWI for Physics, No. 5-2.

246 Cf. Gunter Nagel, Nuclear Tests, p. 93.

247 Cf. German Patent Office No. 1 058 643.

248 Cf. Gunter Nagel, Nuclear Tests, p. 11ff.

249 Cf. Federal Office for Radiation Protection, Radiological investigation on the Site of the former test facility of the HWA in Gottow, April 4th, 2000, in: Günter Nagel, Atomversuche, p. 316f.

250 Cf. Federal Office for Radiation Protection, Radiological investigation on the Site of the former test facility of the HWA in Gottow, April 4th, 2000, in: Günter Nagel, Atomversuche, p. 316f.

251 Cf. measurement logs by Dr. Dirk Schalch (Casting).

252 Cf. Günter Nagel, Atomversuche, p. 143f.

253 See final report of May 6, 1968, MfS district office in Arnstadt, archive of the BStU, Erfurt.

254 Interview with Prof. Dr. Reinhard Brandt on October 23, 2004.

255 Letter from A. Kupzov, Deputy. Chairman of the State Planning Commission of the USSR, to the Head of the Special Committee Georgy M. Malenkov, May 8, 1945 »On the export from Germany of equipment and materials necessary for the work of Laboratory No. 2, in: LD Rjabev (Ed.), Atomnij Projekt CCP (The Soviet Atomic Project 1938-1945), Second Volume, Moscow 2002, Doc. 344, p. 286.

256 Cf. Bagge diary, Irving Collection, 2914, Deutsches Museum Mün chen.

257 Quoted from: Dieter Hoffmann (ed.), Operation Epsilon, p. 157.

258 Cf. Mark Walker, Uranmaschine, p. 185.

259 Cf. work calendar Walther Gerlach, Deutsches Museum Munich.

Part Three: AN ALTERNATIVE NUCLEAR CONCEPT

1 The working group was headed by Professor Richard Becker from Göttingen. Among others, the Army Weapons Office (Schumann, Trinks), the Berlin Gatow Air War Academy (Schardin, Sauter) and the Navy Weapons Office participated in the working group. The meetings of this highly qualified panel of experts took place in Gatow and Kummersdorf. In addition, at the beginning of 1942, the explosives industry founded a "hollow charge" development group.

2 Cf. Heinz Freiwald, On the history of the cavity effect in explosive charges, in: Writings of the German Academy of Aviation Research, Berlin 1941; Hubert Schardin, About the development of the hollow charge, Wehrtechnische Hefte 1954, Issue 4, p. 97ff.

3 Franz Rudolf Thomanek, The hollow charge, yearbook of military technology, No. 3, p. 76.

4 Cf. Fritz Hahn, Weapons and Secret Weapons of the German Army 1933-1945, Bonn 1998, p. 88.

5 Cf. on the biography: Richard Emil Kutterer, appraisal, in: Working Group for Wehrtechnik (ed.), Contributions to Ballistics and Technical Physics. Commemorative writing for Hubert Schardin. Appreciations and essays (= supplement No. 7 of the military technical monthly), Frankfurt 1967, pp. 7-10; Hans-Eberhard Caspary, obituary for Hubert Schardin, yearbook of military technology, 1966, no. 1, pp. 19-22.

6 Cf. Max Steenbeck, Scientific Publications of Siemens Works, Vol. XVIII, p. 363 (1938).

7 Cf. Rudi Schall, X-ray strobes in operation and use, May 1953.

8 Hubert Schardin, About the development of the shaped charge, in: Wehrtechni sche Hefte 1954, Issue 4, p. 119.

9 Cf. Adolf Baeumker, On the history of German aviation research, Munich 1944, 31-44; Burghard Ciesla, Helmuth Trischler, Legitimation through use: rocket and aeronautic research in the Third Reich and the USA, in: Mark Walker (ed.): Science and Ideology. A Comparative History, London, New York 2003, pp. 156-185.

10 Cf. Interview with Professor Hauke Trinks on April 29, 2004. The group around Trinks included the physicists Rudi Schall, Gerd Hinrichs, Werner Holtz, Ortwin Schulze, Werner Schwietzke and Günter Sachsse.

11 Cf. eg: Erich Schumann, Gerd Hinnchs, Preliminary communication on Report 43/2 on the increase in effectiveness of hollow explosive devices by detonation guidance (lenses); Erich Schumann, About explosive weapons, explosives physics report 44/9, November 16, 1944, Erich Schumann estate.

12 Cf. IfZ Munich, Irving Collection, ED 100/12, Bl. 31694f.

13 Reference is only made to a research report by Hubert Schardin, Mine effect of undammed explosive devices, Gatow, July 14, 1944. This report went to the OKM FEP, OHK Army Weapons Office, OKM Weapons Office, among others. See BA-MA Freiburg, RL 39/72.

14 Cf. Gottfried Guderley, Strong spherical and cylindrical compression shocks near the center of the sphere or the cylinder axis, in: Journal for Aviation Research, 1942, Vol. 19, Lfg. 9, pp. 302-312;

Adolf Busemann, The axisymmetric spherical supersonic flow, in: ibid., Vol. 19, Lfg. 4, pp. 137-145.

15 Cf. Walter Seifritz, Nuclear explosive devices, p. 138.

16 Cf. Dieter Hoffmann, Carl Ramsauer, The German Physical Society and the self-mobilization of the physicists in the »Third Reich«, in: Helmut Maier (ed.), Armament Research in National Socialism, Göttingen 2002, pp. 273-304.

17 Cf. Erich Schumann, »The Truth«, Nachlass Erich Schumann.

18 Cf. Robert Atkinson, Fritz Houtermans, On the question of the possible structure of the elements in stars, in: Journal for Physics 1929, vol. 54 (9/10), pp. 656-665.

19 Cf. www.Astro.UniBonn.de, Physics of the Stars.

20 Cf. Friedwardt Winterberg, The truth about the so-called »secret« of the hydrogen bomb, p. 28.

21 Cf. eg: Rausch von Bäumeberg, The penetrating radiation occurring during lithium shattering, in: Naturwissenschaften. (21) 1933, p. 694; the same, backscattering of neutrons and the production of spaces with increased neutron concentration, in: Journal for Physics (104) 1937, pp. 442-447.

22 Cf. Ruth Stanley, Transfer of armaments technology to Latin America through scientific migration: German armaments experts in Argentina and Brazil 1947-1963, dissertation FU Berlin 1996, pp. 183-203. Born as the son of an industrialist from Falkenau in Egerland, Richter studied and received his doctorate in Prague. From 1936 he ran a small research laboratory near his hometown. There he began research on electric arcs and shock wave-like plasma reactions in magnetic fields. After the Second World War he went to Argentina and began building a fusion reactor on the Huemul Peninsula on behalf of the government. This project caused a worldwide sensation, since in the spring of 1951 Juan Peron boasted that Argentina would soon have nuclear weapons. Huemul is about to build a fusion reactor and solve the problem of controlled nuclear fusion. if

If such a reactor had worked, it would have been possible to produce large amounts of fissile material and also tritium for thermonuclear bombs. The news from Argentina excited Washington and Moscow. But experts reassured the military and politicians of both great powers. Richter is a man who blurs fantasy and reality. But there were other voices too. dr Hall, a member of a commission that traveled to Argentina from the USA, described him as a “mad genius” and said: “Dr. Richter is thinking in the year 1970” (Air Intelligence Information Report, NARA Paperclip Documents 1945-58, Rec. Group 330, Box 544, JIOA Files).

23 Cf. National Archives, College Park, Foreign Scientist Cases Files for Project Paperclip, Group 330, Box 54 (JIOA Files), Dr. Ronald Richter.

24 See Air Intelligence Information Report, NARA Paperclip Documents 1945-58, Rec. Group 330, Box 544, JIOA Files.

25 Cf. ORF radio broadcast from August 2002.

26 Cf. letter from Karl Wirtz to the OKH (Commander of the Reserve Army

res) of July 2nd, 1941, regarding: patent specification 662 036, Archive of the MPG, KWI for Physics, No. 29, Bl. 328f.

27 ibid.

28 Cf. Formula collection by Friedrich Berkei (probably 1944).

29 Reinhard Brandt (Marburg), Karl Heinz Lindackers (Berlin), Gerhard Fussmann (Berlin), Friedwardt Winterberg (Reno, USA) and Ulrich Schmidt-Rohr (Heidelberg).

30 See HV Hajek, The Possibilities of Nuclear Reactions Using Shaped Charges, in: Military Technical Monthly Issues, 1955/1; the same, the possibilities of nuclear reactions using shaped charges, in: Wehrtechnische Monatshefte, 1960/1, pp. 8-21.

31 Cf. sketch by Ida Noddack, University Archives Leuven, T 209/138.

32 Cf. interview with Prof. Dr. Alfred Klemm on April 4, 2004; Alfred Klemm, Lithium in Nuclear Technology, in: Angewandte Chemie, Vol. 70, 1958, No. 1, pp. 21-24. The pioneers of lithium research also included Robert Döpel (Leipzig) and Franz Kirchner (Cologne).

33 Cf. Carl Friedrich von Weizsäcker, report of April 15, 1940, archive of MPG, KWI for Physics No. 54, Bl. 35f.

34 Cf. Ulrich Jetter, in: Physikalische Blatter, 1950/6, p. 199.

35 Cf. Erich Schumann, »The Truth«, Part II, p. 4ff.

36 Cf. Walter Trinks, About the nature of detonation and the mode of action of hollow explosive charges, in:Soldiers and Technology 1958/11; Rudi Schall, Advances in military explosives research, in: Wehrtechnische Zeitenhefte, Vol. 54, 1957, pp. 386-394.

37 Conversation with Dr. Reichenbach and Dr. Krehl from the Ernst Mach Institute Friborg on November 8th, 2004.

38 Cf. Walter Trinks, 10 million Atm through molecular fragmentation, in: Soldier and Technology, 1958/12, p. 604.

39 Letter from Schumann to Telschow dated April 2, 1948, Archive of the MPG, Department III, Rep. 83, No. 286.

40 Cf. Walter Herrmann, Georg Hartwig, Heinz Rackwitz, Walter Trinks, H. Schaub, Experiments on the Initiation of Nuclear Reactions by the Effect of Explosive Substances, G-303, Deutsches Museum Munich.

41 Cf. Werner Tautorus (alias Kurt Diebner), The German Secret Work on Nuclear Energy Utilization During the Second World War 1939-1945, in: Atomic Energy, 1956.

42 Cf. Kurt Diebner, Fusion processes with the help of convergent shock waves - some older and more recent experiments and considerations, in: Kerntechnik, March 1962, p. 90.

43 Cf. Walter Herrmann, Georg Hartwig, Heinz Rackwitz, Walter Trinks, H. Schaub, Experiments on the Initiation of Nuclear Reactions by the Effect of Explosive Substances, G-303, Deutsches Museum Munich.

44 Cf. BArch Berlin-Lichterfelde, BDC, R 4901/12850. sheet 245; Letter from Schumann to Telschow dated April 2, 1948, MPG archive, Section III, Rep. 83, No. 286.

45 Kurt Diebner, merger processes, p. 90.

46 Cf. Walter Trinks, About a process for generating the highest pressures and temperatures (unpublished manuscript 1943), quoted from:

H. von Falser, About the explosive-driven implosion of gas-filled metallic hollow bodies, August 1972.

47 Letter from Schumann to Telschow dated April 2, 1948, Archives of the MPG, Department III, Rep. 83, No. 286.

48 Erich Schumann, »The Truth«, Part II, Bl. 30.

49 Erich Schumann, »The Truth«, Part II, Bl. 34. Also on this: E. Schu mann, G. Hinrichs, Increasing the Performance of Hollow Explosives by Special Detonation (Lens), Report of the Reich Research Council 1943/44.

50 Erich Schumann, "The Truth", Part II.

51 See letter from Duhm to lecturer Dr. König (Reich Ministry of Aviation) of January 24, 1943, BArch Berlin-Lichterfelde, R 26 III, No. 364.

52 Letter from Osenberg to Gerlach dated March 14, 1944, BArch Berlin Lichterfelde, R 26 III, no. 516 a.

53 Cf. letter from Basche (OKH) to Mentzel (RFR) of December 9, 1944, BArch Berlin-Lichterfelde, R 26 III/4.

54 Deutsches Museum Munich, Irving papers, no. 31 605, interview with Otto Haxel on February 28, 1966.

55 Cf. The physicist Heinrich Bauer and the explosives chemists Schwennesen, Bosser and Adolf Wortmann took part. See CIOS Report on the CPVA - Item No. 2, File No. XXIII-II CIOS Item 2 (Explosives) Target 2/61, Investigator Cdr. P Bethel.

56 Cf. Gerlach notebook from spring 1944, Deutsches Museum Mün chen, NL 080/270-63-68.

57 Interview with Professor Hauke Trinks on April 29, 2004.

The bulletin of the HWA said, for example: »The Army Weapons Office is with General Admiral Witzell and the departments under his control connected in many areas by a cooperation based on the best of understanding.« (Bulletin of the HWA, Vol. 2 Issue 8/9 1942, p. 70)

58 Cf. Walter Lohmann, Hans H. Hildebrand, The German Navy, Bad Nauheim 1957, p. 12.

59 See letter from Gerlach to Osenberg dated October 13, 1944, BArch Berlin-Lichterfelde, NS, R 26 III, no. 516 a; Frank Baranowski, Secret armaments projects in southern Lower Saxony and Thuringia during the Nazi era, Duderstadt 1995, p. 40.

60 Cf. David Irving, The Dream, p. 221.

61 Cf. Thomas Powers, Heisenbergs Krieg, p. 447.

62 Cf. activity report of the FEP office group for 1943 (Wilhelm Rhein), Appendix No. 3, BA-MA Freiburg, RM 7, No. 174. The customer for Houter mans was Lieutenant Commander Professor Hellmut Hasse.

63 Cf. letter from Houtermans to Joliot-Curie dated April 9, 1945, Irving Papers, No. 311150, Deutsches Museum Munich.

64 Cf. Gerlach notebook from spring 1944, Deutsches Museum Mün chen, NL 080/270-63-68.

65 Cf. interview with Walther Gerlach of December 5, 1965, Irving papers, Deutsches Museum Munich, no. 291232-21236.

66 Joliot-Curie faced difficulties there. He was targeted by the Gestapo. Arriving in Paris, Gerlach helped the Curies and provided for them

their security. He also ordered that no institute equipment should be dismantled. Gerlach also discussed the problems of thermonuclear reactions with Wolfgang Riezler, who worked on the Paris cyclotron. Details have not been handed down.

67 Cf. Peter A. Thiessen, Memoiren, Berlin 1984. I am grateful to Prof. Dr. Klaus Thiessen for allowing me to inspect the unpublished manuscript. Peter A. Thiessen and his biographer, Christina Eibl, date the meeting to spring/summer 1943, which cannot be correct, especially since in connection with the meeting the destruction of KW1 for chemistry in Berlin-Dahlem by a bri tical air raid and the subsequent rescue of the library. Hahn's institute was hit hard again on February 15, 1944 and a few weeks later. Therefore, the meeting could have taken place a little later, i.e. in the spring of 1944.

There may have been several meetings in this round. For August 24, 1944, Gerlach noted in his service diary: »Outside to Geist!« (Walther Gerlach service calendar, Deutsches Museum Munich).

68 Peter A. Thiessen, Memoiren, p. 344f.; Christina Eibl, The Physiochemist Peter Adolf Thiessen as Science Organizer (1899-1990). Eine Biographical Study, Stuttgart 1999, p. 186f.

69 Cf. Friedrich Geist's personnel file, BA-MA Freiburg, pers. 6, No. 10352.3.

70 ibid.

71 See CV of Friedrich Geist, NA Washington, RG 319, Entry RR, box 58; Erich Schneider, obituary for Friedrich Geist, in: Military Technical Monthly Issues 55 (1958), p. 433f.

72 Cf. Dieter Hoffmann (ed.), Operation Epsilon, p. 157.

73 Cf. Who was who in the GDR? A biographical dictionary, Berlin 2001. p. 850.

74 Peter A. Thiessen, Memoirs, p. 344.

75 Cf. Christina Eibl, Der Physiochemiker Peter Adolf Thiessen, p. 344f.; Interview with Georg Graue on April 4, 1966, Deutsches Museum Munich, Irving Collection, ED 100/5, Bl. 291259f.

76 Quoted in: David Irving, The Dream, p. 220.

77 Peter A. Thiessen, Memoirs, p. 348.

78 Interview with Prof. Dr. Klaus Thiessen on January 19, 2005.

79 Cf. Richard Overy, The Roots of Victory, Munich 2002; Hitler's Terror Weapons: The Prize of Vengeance, London 2003.

80 Cf. Military History Research Office (ed.), The German Reich and the Second World War, Vol. 5/2, Stuttgart 1999, p. 693ff.

81 Ibid., p. 414.

82 Quoted from: Heinz-Dieter Holsken, Die V-Waffen, p. 105.

83 Joseph Goebbels, Total war becomes practical reality, in: Völkischer Beobachter of July 28, 1944, Institute for Contemporary History Munich, MZ 9/112.

84 Cf. Albert Speer, recollections, p. 418.

85 "The new German weapons cast their shadows ahead" by our Lisbon reporter, in: Völkischer Beobachter of July 28, 1944, Institute for Contemporary History Munich, MZ 9/112.

86 Cf. e.g. Richard Overy, The Roots of Victory, p. 304.

87 Cf. Otto Skorzeny – La guerre inconnue (The Unknown War), Paris 1975, p. 152.

88 Cf. Hubert Faensen, High-Tech for Hitler, p. 83.

89 Cf. Willy A. Boelcke, Germany's Armaments in World War II: Hitler's Conferences with Albert Speer 1942-1945, Frankfurt/M. 1969, p. 137.

90 Conversation between Hitler and Mussolini on July 20, 1944, in: Andreas Hillgruber (ed.), Staatsleute und Diplomats bei Hitler. Confidential records of conversations with representatives from abroad 1942-1944, Frankfurt/M. 1970, Vol. 2, p. 470ff.

91 Quoted from: David Irving, Führer und Reichskanzler – Adolf Hitler 1933-1949, Starnberg am See 1997, p. 210.

92 Conversation between Hitler and Miklos on July 21, 1944, in: Andreas Hillgruber (ed.), statesmen and diplomats under Hitler. Confidential records of conversations with representatives from abroad 1942-1944, Frankfurt/M. 1970, Vol. 2, p. 480.

93 Conversation between Hitler and Antonescu on August 5, 1944 in: Andreas Hillgruber (ed.), Staatsmanner, vol. 2, p. 482.

94 Ibid., p. 483.

95 Ibid., p. 484.

96 Gustav Büscher – Research – for you! with a foreword by Hans Dominik, Leipzig 1944.

97 Cf. Manfred Somlinski, The Neubrandenburg Torpedo Research Institute, in: Monuments and heritage of the history of technology in Mecklenburg and Western Pomerania, 1997, pp. 161f.

98 Cf. Eberhard Rossler, Die Torpedoe der Deutschen U-Boote, Herford 1984, p. 91.

99 Cf. OKM report of February 16, 1940, BA-MA Freiburg, RM 7, No. 174.

100 Cf. service calendar Walther Gerlach, entry March 21 and 23, 1944, Germany sches Museum Munich.

101 Cf. work calendar Walther Gerlach, Deutsches Museum Munich.

102 Cf. Christoph Regel, Die Erprobungsstelle Rechlin, in: Flugerprobungsstellen bis 1945, Bonn 1998, p. 60ff.

103 Cf. letter from Karl Spietz (Department of Public Education) to Gerhard Remdt of April 26, 1966; Letter from Karl Spietz to the "Neue Friedländische Zeitung" of September 15, 1995, Heimatmuseum Friedland, No. 157; »Who were the rubber men from Friedland?«, in: »Neue Friedländer Zeitung« of June 7th, 1995.

104 Letter from Ingeborg Brandt to Karl Spietz dated October 20, 1995, Heimatmuseum Friedland, file no. 157.

105 Conversation with Irene König on July 16, 2004.

106 Information from Botho Stüwe of July 23, 2004.

107 Cf. Wolfgang Steurer, investigation “on the behavior of aluminum alloys at higher temperatures and simultaneous static and oscillating stress”, o.O., 1941.

108 Letter from Karl Spietz (Department of Public Education) to Gerhard Remdt dated February 24, 1967, Heimatmuseum Fnedland, No. 157. In January 1945, the Lindemayer and Steurer groups were transferred to Thuringia.

109 Cf. Christoph Regel, Die Erprobungsstelle Rechlin, p. 60ff.

110 David Irving, The Dream, p. 220 wrongly assumes that it was Myrow in Silesia. What was meant was Mirow in Mecklenburg.

111 Cf. Service calendar Walther Gerlach, March 31 - April 1, 1944, Deutsches Museum Munich. Gerlach wrote to Osenberg on March 31, 1944: “I cannot keep our appointment today because I have to go to the Baltic Sea for a very urgent naval appointment!” (BArch Berlin Lichterfelde, R 26 m, no. 516a).

112 The Scientific Staff of the Navy included: SS Obersturmbannfuhrer Küpfmüller (Head), Prof. Cornelius (Head of AGC), Prof. Esau (President of the PTR), Prof. Fassbender (Institute for Vibration Research Berlin), President Gerwig (Research Institute of the Reichspost), Prof. Gladenbeck (Representative for remote control technology Research in the RFR), Prof. Joos (on the board of Zeisswerke Jena), Marine Construction Director Dr. Künhold, Dr. Luschen (Siemens & Halske; Head of the Electrical Engineering Main Committee). See BA-MA Freiburg, RM 7/1240, Bl. 157. I would like to thank Helmut Maier (Berlin) for this information.

113 Cf. www.nue.tu-berlin.de/history/kuepfmueller.htm. 2004 114 Cf. Interview with Werner Grothmann on August 3, 2000 conducted by Wolf Krotzky.

115 The most important documents of the Wannsee Institute were destroyed by Prof. Hasse in 1945. The Wannsee Institute was relocated to Göttingen in February 1945. Hasse fled to the Harz Mountains in April and was captured there by the British. He explained to them that he had "forgotten" all the details of the research conducted under his direction.
Prof. Karl Willy Wagner was responsible for all technical details. (Cf. Applied mathematical research in Germany, with particular reference to naval applications, BIOS Report No. 79, p. 46ff.)

116 Cf. service calendar Gerlach, September 1944, Deutsches Museum Mün chen.

117 Cf. Gerlach service calendar, entry September 14, 1944, Deutsches Museum Munich.

118 Cf. Service calendar Gerlach, entry September 19, 1944, Deutsches Museum Munich.

119 Cf. Erich Schumann, »The Truth«, Erich Schumann Nachlass.

120 Based on the entries in Gerlach’s service calendar, we can conclude that the research advisory board of the HWA met with the naval group on September 19 and with the group of the HWA on September 25, 1944. Professor Thiessen attended both meetings.

121 Erich Schumann, »The Truth«, Part II, Bl. 24.

122 Erich Schumann, "The Truth", Part II.

123 Cf. Erich Schumann, »The Truth«, p. 81.

124 Cf. detailed minutes of the meeting of the working group Letterpress on October 9, 1944 in Munich, RFR, Prof. Gerlach, October 30, 1944, BArch Berlin-Lichterfelde, NS, R 26/111 No. 29.

125 Cf. letter from Gerlach to Osenberg dated October 13, 1944, BArch Berlin Lichterfelde, NS, R 26 HI, no. 516 a. The company had only been founded in mid-1944. (Cf. Frank Baranowski, Secret Arms Projects in

Southern Lower Saxony and Thuringia during the Nazi period, Duderstadt 1995, p. 40).

126 Interview with Ms. Guderian-Fhlberg on November 28, 2004. Your statement is confirmed by an entry in Gerlach's service calendar (cf. Service calendar Gerlach, entry October 10, 1944, Deutsches Museum Munich).

127 The anti-aircraft rocket specialist's report on this has existed for several years Rudolph Zinsser, who at the beginning of October 1944 claims to have flown past a "nuclear test site" in a He 111 at a distance of twelve to fifteen kilometers. He did not name his assignment, the exact location, or the exact date. Zinsser's descriptions of an unusually powerful flash of light, a powerful blast wave, violent electromagnetic interference, and a large blast cloud are quite impressive. They were recorded by American Air Force officers. The US Air Force had also managed to interview other witnesses who were more or less informed about the status of German nuclear research.

The results of the interrogations were included in a report dated August 19, 1945. What the Air Force didn't mention, their sources were only second-rate scientists with only fragmentary knowledge of the uranium project work. (See USAF Historical Research Agency, Maxwell AFB Alabama, USSA Report from August 19, 1945: Investigations, research, developments and practical use of the German atomic bomb, Roll A/007P) Although the Air Force Report of August 19, 1945 more than Two hundred copies were made and sent to various departments, it is unlikely that any of the readers would attach much importance to Zinsser's descriptions. Too often during the war there were observations that could not be clearly assigned. Thus, Zinsser's report ended up in the archive. Even historians later could not do anything with this document. Although they referred to Edse, Lieb and Harnes, they ignored Zinsser's statements. (Cf. Thomas Powers, Heisenberg, p. 207ff; Paul L.

Rose, Heisenberg, p. 179).
Wolfgang Ebsen has made an effort to compile a biography of Zinsser and to clarify contradictions in his statements. He came to the conclusion that there is still a lack of supplementary documents in order to be able to correctly classify the Zinsser report.

128 Cf. Luigi Romersa, Las »Armas Secretas de Hitler, algo mas que fantasia, in: Defensa, August/September 1984.

129 Cf. Las Provincias, March 1959 editions.

130 Cf. Pass from Mussolini's adjutant for Romersa, Archivo Centrale dello Stato Rom, SPD CO RSI B 65, file 5680.

131 Interview with Luigi Romersa on December 18, 2003 in Rome.

132 ibid.

133 Goebbels diary, part II, vol. 14, October 7, 1944, p. 52.

134 Information from the Federal Maritime and Hydrographic Agency (BSH), Hamburg.

135 Cf. telephone memo of October 29, 1944 and permits from the adjutant's office

by Mussolini for Romersa from October 29th and 30th, 1944, Archivo Centrale dello Stato Rom, SPD CO RSI B 65, file 5680.

136 Interview with Luigi Romersa on December 18, 2003 in Rome.

137 Cf. La Germania dl fronte all'ultima fase della guerra, Corriere della Sera 11/1/1944; Note from the Prefect of the Province of Brescia dated November 17, 1944, Archivo Centrale dello Stato Rom, SPD CO RSI B 65 File 5680.

138 Cf. Il Duce fra il popolo, Corriere della Sera, December 17, 1944.

139 Il Duce fra il popolo, Corriere della Sera, December 17, 1944.

140 Cf. Jasper Ridley, Mussolini, New York 1997, pp. 421f.

141 Cf. Gian Gaetano Cabella, Testamento politico di Mussolini, Rome 1948.

142 My thanks go to Lutz Riemann, Michael Schmidt and Heiko Peterman.

143 I would like to thank Mr. Wolf Krotzky for pointing this out.

144 The American aerial photos from April 19, 1944 and April 4, 1945 as well as a Russian aerial photo from 1953 were evaluated by Matthias Muckel & part (Mullner, Hanover).

145 Cf. letter from Prof. Dr. Reinhard Brandt from September 2004 to the Author.

146 Cf. service calendar Gerlach, 23.10. 1944, Deutsches Museum Munich.

147 Cf. Matthias Uhl, Henrik Eberle, Das Buch Hitler, Berlin 2005.

148 Minutes of the meeting of the ob. i.e. M. in the Führer headquarters "Wolfsschanze" from October 13th to 14th, 1944, library for contemporary history Stuttgart, microfilm.

149 Cf. Walter Naasner, SS Economy and SS Administration, Düsseldorf 1998.

150 Cf. Albert Speer, recollections, Berlin 1969, pp. 383f.

151 Cf. Michael Thad Allen, The Business of Genocide – The SS, Slave Labour, and the Concentration Camps, London 2002.

152 Cf. Willy A. Bölcke, Armor, Führerbetreff August 19-22, 1943, p. 291.

153 See the extensive literature on the Third Party's missile weapons Reiches above all: James McGovern, Crossbow and Overcast, New York 1964; Manfred Bornemann: The history of the German V-weapons works, Munich 1971; Heinz Dieter Holsken, The V-weapons: emergence - propaganda - war use, Stuttgart 1984; Walter Dornberger, Peenemünde. The history of V-weapons, Frankfurt/ M. 1989; Michael Neufeld, The Rocket and the Reich, Berlin 1995; Volkhard Bode, Gerhard Kaiser, Rocket Traces: Peenemünde 1936-1994, Berlin 1995; Rainer Eisfeld, Moonstruck. Wernher von Braun and the birth of space travel out of the spirit of barbarism, Reinbek 1996; Jens-Christian Wagner, Production of Death. The concentration camp Mittelbau-Dora, Wallstein 2001.

154 Quoted in: Rainer Fröbe, Hans Kammler, Technocrat of Destruction, in: Robert Smelser; Enrico Synng (ed.), The SS. Elite under the Totenkopf. 30 CVs, Paderborn 2000, p. 312.

155 Cf. Jens-Christian Wagner, Production of Death, p. 89.

156 Cf. Andre Sellier, Forced Laborers in the Rocket Tunnel. history of Camp Dora, Lüneburg 2000, p. 117.

157 Letter from Speer to Kammler dated December 17, 1943, BArch Berlin Lichterfelde, R 3, no. 1583.

158 Cf. BArch Berlin-Lichterfelde, BDC, PA Kammler.

Remarks

159 Cf. Michael Neufeld, The Rocket, p. 288ff.

160 Cf. Himmler's letter to Kammler dated August 6, 1944, quoted in: Michael Neufeld, The Rocket, p. 289.

161 Cf. Heinz-Dieter Holsken, V-Waffen, p. 72f.

162 Cf. Michael Neufeld, The Rocket, p. 277.

163 Cf. Michael H. Kahr, Das Ahnenerbe der SS, Stuttgart 1977, p. 220ff.

164 Cf. BArch Berlin-Lichterfelde, BDC, Hans Kammler.

165 Memorandum Dornberger on the lecture given to the Fuehrer and Supreme Commander of the Wehrmacht on August 21, 1941, NASM, FE 341.

166 Cf. Hermann Oberth, Wege zur Raumschifffahrt, Munich 1929, p. 205.

167 Cf. BA-MA Freiburg, RH 8/V.

168 In October 1942, the research institute of the Reichspost received a research assignment.

169 Cf. Interrogation of Rudolph Schubert on April 23, 1945, NA Washing clay, RG 498-273-88.

170 ibid.

171 Cf. Walther Dornberger, Peenemünde, p. 118.

172 Cf. Michael Neufeld, The Rocket and the Reich, p. 137.

173 Cf. Albert Ducrocq, Les armes secretes allemandes (The Germans Secret Weapons), Paris 1947, p. 142f.

174 Cf. Michael J. Neufeld, The Rocket, p. 300.

175 Cf. Heinrich Klein, From Projectile to Fire Arrow, 1977.

176 Cf. Karl-Heinz Hoppe, V-weapons test 1941-45 between Lontzke Düne and Leba? in: Stolper Heimatkreise eV, bulletin 2003.

177 Cf. Heinrich Klein, From Projectile to Fire Arrow, p. 97.

178 Brief report: Transfer by SD from Tucheler Heide to Italy, Headquarters USSAF in Europe August 19, 1947, NA Washington, RG 319, Entry 134 A, Box 2829.

179 Cf. minutes of the discussion of December 9, 1944 at Wa Prüf 10, BA-MA, RH No. 8/V. In these minutes, director Guardian from the development work in Karlshagen is named.

180 Brief report: Transfer by SD from Tucheler Heide to Italy, Headquarters USSAF in Europe August 19, 1947, NA Washington, RG 319, Entry 134 A, Box 29.

181 It is unclear whether the word »plutonium« was already being used by German scientists at this time. Plutonium was first mentioned in June 1945 by Werner Czulius, one of Diebner's employees, during an interrogation by the Soviet secret service. (Werner Czulius, memory protocol without the aid of documents, Berlin June 1945, archive of the MPG, no. 19207) He could not know the word from the English-language literature because it was not accessible to him.

182 Brief report: Transfer by SD from Tucheler Heide to Italy, Headquarters USSAF in Europe August 19, 1947, NA Washington, RG 319, Entry 134 A, Box 29.

183 Cf. Vladimir Karlicky, et al. Svet okridleneho Sipu. Koncern Skoda Plzen 1918-1945 (The Skoda Group 1918-1945), Skoda 1999.

184 Letter from Voss to Himmler dated March 30, 1942, BArch Berlin-Lichterfelde, NS 19/1935, sheet 8.

185 Cf. Fritz Hahn, Weapons and Secret Weapons of the German Army 1933-1945, Vol. II, Bonn 1992, p. 180.

186 Cf. Eugen Kogon, The SS State. The system of German concentrations tion camp, Munich 1991, p. 334; beech forest reminder and obligation. Documents and Reports, Berlin 1983, p. 285; Dieter indicator, Hitler's last refuge? p. 168.

187 Trials of the War Criminals before the Nuremberg Military Tribunals under Control Council Law No. 10, Nuremberg October 1946-Apnl 1949, Volume V, Washington 1950.

188 Cf. report to the head of the military department of the SMAD, Lieutenant General Lukyacenko from the deputy of the Head of the Military Sector of the SMA/Th, Lieutenant Colonel Levenzov dated 9/19/1945, GARF Moscow, 73/7-12-37.

189 Report on the tour of the province of Thuringia dated 07/26/1945-08/02/1945 reported by Major Scherbina and Major Akse nov on 08/04/1945, GARF Moscow, 73/7-12-37, Bl. 65-68.

190 Cf. interrogation of Albin Kummer from Weimar (1962) before the culture department of the Arnstadt district council, Arnstadt district archive. Interestingly, at the beginning of the questioning, Kummer pointed to an agreement with the "Soviet comrades" on the extent to which he could testify before the committee.

191 I would like to thank Mr. Andreas Oberholz (Heiligenhaus) for letting me do his research on the Crawinkel complex.

192 memorandum about a meeting with Director Riedel dated June 15, 1944, BA-MA Freiburg, RH No. 8/V.

193 Cf. Minutes of the discussion of December 9, 1944 at Wa Prüf 10, BA-MA Freiburg, RH No. 8/V.

194 Cf. Secret matter of command: Entwicklungswerke mbH Karlshagen: Towing shooting with device "S" (Project test bench XII), 19.1945, BA-MA Freiburg, RH No. 8/V.

195 Cited in: Mark Walker, Uranmaschine, p. 167.

196 Quoted in: Matthias Schmidt, Albert Speer. The end of a myth. The uncovering of his falsification of history. Speer's true role in the Third Reich, Bern, Munich 1982, p. 9.

197 Cf. interrogation of Erich Gimpel, PRO Kew, KV 2564 198 Cf. II /460.
Michael Neufeld, The Rocket, p. 288.

199 Letter from SS Obergruppenfuhrer Hossmann to Gauleiter Murr and Wagner dated June 22, 1944, BArch Berlin-Lichterfelde, NS 19/317.

200 Cf. Helmut J. Fischer, Memoirs, Part II, 1985.

201 Cf. Paul Lawrence Rose, Heisenberg, p. 195.

202 Cf. Albert Speer, The Slave State, My Confrontation with the SS, Stuttgart 1981, p. 223f.

203 Cf. BArch Berlin-Lichterfelde, BDC, Otto Schwab.

204 Cf. letter from Goudsmit to Furman dated May 21, 1945, Irving Papers, DM, #311164; Dieter Hoffmann (ed.), Operation Epsilon, p. 175.

205 Cf. Letter from the Field Command to SS-Group Leader Hilgenfeldt of September 16, 1944, BArch Berlin-Lichterfelde, NS 19, No. 2168.

206 Cf. letter from Himmler to Pohl dated June 22, 1944, Nuremberg Documents, no. 640

207 ibid.

208 Letter from Gerlach to Sievers dated August 29, 1944, Nuremberg documents, No. 640

209 Cf. Michael H. Rahe, Das »Ahnenerbe«, p. 223.

210 Cf. Bernhard Strebel, Jens-Christian Wagner, forced labor for For research institutions of the Kaiser Wilhelm Society 1939-1945, Berlin 2003, p. 62f.

211 Top secret report by Major General Sidnev of March 21, 1946 on the interrogation of Franz Germann, MPG archive, inventory 19106.

212 Cf. service report from the head of the MGB operative sector in Berlin, Major General Sidnev, to the Deputy Minister of the Interior, Lieutenant General Zavenjagin, dated April 21, 1946, on the removal of Franz Germann from the SBZ at his disposal, MPG archive, inventory 19106, p. 198 .

213 Cf. Kalashnikov's report to General Zavenyagin on Franz Germann's theoretical work and suggestions of May 7, 1946, ibid., p. 197.

214 Cf. Gregor Janssen, The Ministry Speer, Berlin 1968, p. 103.

215 Cf. letter from Lieutenant General Jevstignev to the head of the Staff of the SMAD, Lieutenant General Lukatshenkov, dated September 16, 1946 on the relocation of research facilities and scientists from Volkenrode to Great Britain, GARF Moscow, 7317-12-63, pp. 112-114.

216 Luftwaffe and SS showed particular interest in "beam weapons", with which one wanted to »shoot down« airplanes or at least fatally irradiate their crews. An outlandish idea that was rejected by most reviewers, including Gerlach and Heisenberg. (Cf. Burghard Weiss, The megavolt X-ray system of the Hamburg-Barmbek General Hospital (1938-1945), in: Medizinhistorisches Journal 35 (2000), p. 77; the same, "A researcher without a laboratory is like a soldier without a weapon" Ernst Schiebold and non-destructive materials research and testing in Germany, in: Dieter Hoffmann (ed.), Physics in post-war Germany, Frankfurt am Main 2003.

217 Cf. Pedro Waloschek, The Infancy of Particle Accelerators. Life and Work of Rolf Wideroe, Hamburg 1994; Tor Breastad, Rolf Wideroe: Eminent vitenskapsmann – fotnote I norsk fysikk?

218 Cf. Rolf Wideröe, The radiation transformer, in: Archiv für Elektrotech nik, Volume 37, 1943, Issue 8, pp. 391-408.

219 Cf. Archive of the MPG, KWI for Physics, No. 37. Secret Reich matter stamped as an attachment to Section No. 4/44 g. KdS I b.

220 Cf. Reinhard Brandt, Accelerator driven Systems for transmutation and energy production: challenges and dangers, Kerntechnik 69 (2004) 1-2; Interview with Prof. Dr. Reinhard Brandt, Prof. Dr. Ulrich Schmidt-Rohr, Prof. Dr. Karl Heinz Lindackers and Prof. Dr. Gerhard Fussman.

221 Since the end of 1939, Diebner's group in Gottow also had a small neutron generator from the Müller company. This facility was only good for basic research and was never mentioned. Report from

Karl Zimmer on nuclear physics work in Germany from August 25, 1945: high-voltage systems, archive of the MPG, no. 19208.

222 Cf. Letter from the Chief of the Main Department for Military Intelligence, Lieutenant General Ivan I. Ilyitshov, to the Chief of the General Staff of the Red Army, General Antonov, dated March 23, 1945, distribution list: Stalin, Molotov, Antonov, Archives of the President of the Russian Federation, Fund 93, Division 81 (45), List 37.

223 See letter from the AEG High Voltage Institute to Diebner dated March 16, 1945, Samuel A. Goudsmit Papers, Personnel Information: Stadtilm 1945, Folder 32, Box 287, Niels Bohr Library, American Institute of Physics.

224 Cf. Franz W. Seidler, Dieter Show, The Führer Headquarters - Installations and Planning in the Second World War, Munich 2001, p. 351.

225 Communication from Dr. Schalch, Radiation Protection Laboratory at the Justus Liebig University in Giessen, December 7, 2004: 0.13 Bq/300 gram sample, tolerance +/- 40%. For the year 1945 this results in 266 Bq/ 300 grams, neutron fluence > 10 E 18 n/cm.

226 The British author Nick Cook discusses this in his book »Point Zero" and speculated by Polish amateur researchers in an internet article entitled "The Other Method" with reference to alleged RSHA files. To date, they have not provided any proof of the source.

227 Cf. Hans-Ulrich Rudel, My War Diary, Munich 1983, p. 164.

228 Cf. Nikolaus von Below, Als Hitlers Adjutant, Berlin 1980, p. 390.

229 Cf. Ian Kershaw, Hitler 1936-1945, Stuttgart 2000, p. 963.

230 Otto Skorzeny – La guerre inconnue (The Unknown War), Paris 1975, p. 153.

231 Cf. Henry Picker, Conversations in the Führer Headquarters, p. 531.

232 In this context, a 38-page document found in the archives of the Yad Vashem memorial in Jerusalem should be mentioned, which refers to an alleged order from Hitler dated September 30, 1944 to develop an atomic bomb as quickly as possible.

(See "Tagung der Deutschen Wissenschaften, Oktober 1944", Yad Vashem Archiv, M-9/339. I am grateful to Professor Issachar Unna, Professor Mara Bella and Haim Wainstein of the Hebrew University of Jerusalem for their help in locating the document.)

The document is not dated and bears no signature. The context shows that it was only written after the war, i.e. with knowledge of American and Soviet nuclear research.

Austriazisms are repeatedly found in the report. Entire passages from the text can be found in the book "The History of the Atomic Bomb" by the Viennese physicist Hans Thirring, published in mid-1946. However, individual formulations could also come from the Viennese physicist Friedrich Lachner.

Did Order No. 219 actually exist? There is little to say about that. Such a command could not be found despite an intensive search.

Among the numerous circulars sent out by the head of the Party Chancellery, Martin Bormann, in the fall of 1944 are the

write 216, 217, 294, 302 and others, but none with the number 219. We can assume that such an extraordinary circular from Bormann would not have gone unanswered.

233 Conversation with Rochus Misch on May 30, 2002 in Berlin.

234 Cf. Ian Kershaw, Hitler 1936-1945, p. 951.

235 Cf. NA Washington, USS Report A-44 136/5985 of November 7, 1944.

236 Nicolaus von Below, Adjutant, p. 398.

237 Cf. Joseph Goebbels diary, part II, vol. 15, p. 70.

238 Interview with Theodor Souchek on May 4, 2001.

239 Cf. Matthias Schmidt, Albert Speer, p. 9.

240 Cf. Erich Schumann, »The Truth«, Part II Bl. 3; cf. letter from Schumann to Telschow dated April 2, 1948, Archive of the MPG, Department III, Rep. 83, No. 286.

241 See Helmut J. Fischer, recollections, vol. II, p. 45. Schumann's successor was Dipl.-Ing. Wilhelm Plass took office in February 1945. (See BA-MA Freiburg, N 625/200)

242 Letter from Spengler to Osenberg dated September 26, 1944, BArch Berlin-Lichterfelde, R 26 III, No. 112, Bl. 189.

243 See conversation with Professor Hauke Trinks on May 5, 2004.

244 The trade and finance expert Erwin Respondek, a member of the Center Party from 1928 to 1933 and personal adviser to Chancellor Brüning in 1932/33, after which he was relieved of all public offices, gave information to the American secret service during the war.
In July and November 1945 he wrote lengthy reports on the work of the Uranium Association up to the end of the war and the German scientists who then entered the service of the Soviet Union. Respondek's information was not correct in every detail, but overall gave an apt overview. (Cf. Erwin Respondek, overview of the status of scientific work in Germany on the atomic bomb, Berlin November 6, 1945, NA RA, RG 226, Entry 210, Box 465)

245 Cf. Interview with Werner Grothmann on August 3, 2000. Recorded by Wolf Krotzky.

246 Cf. diary Walther Gerlach 1943/44, NL 80, no. 270, p. 39f.

247 Friedwardt Winterberg, The truth about the so-called "secret" of the hydrogen bomb, in: Kerntechnik, Vol. 34 (1979), Lfg. 2, p. 28f.

248 Cf. Walter Seifritz, Nuclear explosive devices, Munich 1984, p. 151.

Fourth part: MARCH 1945: NUCLEAR WEAPONS TESTS IN THURINGIA

1 Cf. Grothmann claims to have made an appointment for Gerlach with Himmler at least twice. Interview with Werner Grothmann on August 3, 2000. Recorded by Wolf Krotzky.

2 Cf. BArch Berlin-Lichterfelde, NS 19, no. 1793, p. 120.

3 On the last Führer headquarters cf.: Gerhardt Remdt, Günter Wermusch, Riddle Jonastal. The History of the Last »Führer Headquarters«, Berlin 1992; Dieter indicator, Hitler's last refuge? The project of a Führer headquarters in Thuringia 1944/45, Munich 2003.

4 Felix Kersten, Samtel with Himmler. Minnen Fran Tredje Riket 1939-1945, (Himmler's personal physician), Stockholm 1947, p. 272.

5 Cf. letter from the Main Administration for Military Intelligence to the Chief of the General Staff of the Red Army, Army General Antonov, dated November 15, 1944, distribution list: Stalin, Molotov, Antonov. Archives of the President of the Russian Federation, fund 93, department 81 (45), list 37.

6 Cf. Heinz-Dieter Holsken, V-Waffen, p. 75.

7 Cf. Michael H. Kater, The "Ahnenerbe" of the SS 1935-1945, Stuttgart 1974, p. 218ff. The professional qualifications of the scientific staff of the "Ahnenerbe" remains questionable.

8 Cf. letter from Mayor Stadtilm to the District Administrator Arnstadt dated July 27, 1945 regarding an invoice from the merchant Julius Axt, relating to the consumption of the SS intelligence unit 500 stationed in Stadtilm, Gerhardt Remdt archive (Ilmenau).

9 See report of March 6, 1946 on German atomic research, NA Washington, RG 226, No. 212-3. In this source, a Luftwaffe Lieutenant Dr. Schröder-Stramm's speech. In fact, however, it may have been Luftwaffe Colonel Schröder-Stranz, who had been assigned to the SS by the Luftwaffe since July 1944 (Michael H. Kater, The "Ahnenerbe" of the SS 1935-1945, p. 220). Schröder-Stranz had suggested to Himmler that a "radiation device" be built. The device should be used, among other things, to explore oil deposits, but proved to be unsuitable. In Gerlach's service calendar there is a reference to a visit from a Dr. Schröder with him on February 3 in Arnstadt.

10 The polonium isotope Po 210, a strong alpha emitter, decays with a half-life of 138 days to release lead 206.

11 Cf. protocol of the questioning of Dr. Weiss, October 28, 1945, MPG archive, Diebner Group, no. 19208.

12 ibid.

13 Cf. letter from Gerlach to Osenberg dated December 16, 1944, BArch Berlin-Lichterfelde, R 26 III, no. 516 a.

14 See letter from Gerlach to Dr. Fischer (RFR) of January 30, 1945, BArch Berlin-Lichterfelde, R 26 III, No. 516 a.

15 See letter from Osenberg to Gerlach on March 10, 1945, reference: your message of February 15, 1945, BArch Berlin-Lichterfelde, R 26 III, no. 516 a.

16 Cf. letter from Stuhlinger to Remdt of September 9, 2000, Archiv Gerhardt Remdt (Ilmenau).

17 Cf. Hans-Helmut Lawatsch, Wernher von Braun and Ernst Stuhlinger in Thüringen, in: Rudolstädter Heimathefte, 1992/July-August, p. 148. In 1946 Volz received notification from the US War Department that he was applying for a position in the USA suggested. However, he declined. (Cf. Mark Walker, Uranmaschine, p. 218f.)

18 Interview with Prof. Broser on September 20, 2004 in Berlin.

19 Cf. letter from the AEG High Voltage Institute to Diebner dated March 16, 1945, Samuel A. Goudsmit Papers, Personnel Information: Stadtilm 1945, Folder 32, Box 287, Niels Bohr Library, American Institute of Physics.
Prof. Biermanns was the specialist at AEG for high-voltage technology (cf. Josef Biermanns, High Voltage and High Performance, Munich

1949). As late as mid-February 1945, Gerlach sent a circular to several university institutes requesting the personal documents of qualified physicists. (See BArch Berlin-Lichterfelde, R 26/111, No. 276) Apparently he wanted to strengthen his staff in Stadtilm.

20 Arnold Kramish, The Griffin. Paul Rosbaud - The Man Who Failed Hitler's Nuclear Plans, Munich 1987. Curiously, Kramish does not mention Rosbaud's regular visits to Gerlach. The value of the information Rosbaud gave to the British is debatable.

21 Cf. report by Paul Rosbaud of August 5, 1945, Samuel A. Goudsmit Papers, Folder 42, Box 28, Niels Bohr Library, American Institute of Physics, College Park.

22 ibid.

23 ibid.

24 Cf. Gunter Nagel, Nuclear Tests, p. 135ff.

25 Cf. letter from Gerlach to the Agricultural Office in Weimar dated March 21, 1945, Deutsches Museum Munich, Irving-Paper 31346.

26 Quoted from: Gerhardt Remdt, Gunter Wermusch, Puzzle Jonastal, p. 125f.

27 Interrogation protocol of master plumber Erich Rundnagel of July 8, 1966, MfS district office in Arnstadt, BStU branch in Erfurt.

28 Cf. service calendar Walther Gerlach, March 2, 1945, Deutsches Museum Munich.

29 Information from Dr. Joachim E. Meier, Scientific Libraries of the Physical-Technical Federal Institute (PTB) from 09/22/2003.

30 Cf. work calendar Walther Gerlach, Deutsches Museum Munich.

31 The dating is disputed. While Walther Gerlach in his service kalender recorded that he was in Stadtilm with Diebner on March 3rd and left the city on the morning of March 4th, the witnesses interviewed in the 1960s speak of March 4th. Gerlach's dating seems more plausible to us.

32 Cf. Minutes of the questioning of Ms Clare Werner by the Council of the district of Arnstadt, a working group of the SED district leadership and the working group of the castle and local history museum on May 16, 1962, local history museum Veste Wachsenburg (Holzhausen). The inventory of this museum was dissolved in the 1960s. Some of the interrogation protocols, including that of Ms. Werner, came into the district archive of Arnstadt.

33 Interview with Clare Werner on September 25, 1999.

34 Interview with Clare Werner on September 25, 1999. Already in 1962 Mrs. Werner described the event in similar terms.

35 Minutes of the 1962 interrogation of Heinz Wachsmut by the Arnstadt district council, a working group of the SED district leadership and the working group of the castle and local history museum, local history museum Veste Wachsenburg (Holzhausen). A copy of the protocol is also available in the district archive of Arnstadt. Grammar and spelling have been slightly revised.

36 IMT, Document No. 2182PS.; The identity of the victims is unclear. Hungarian and Polish Jews, Yugoslavs, Greeks, Russians, French and Italians were in the camps of the Ohrdruf concentration camp. Besides were

Soviet prisoners of war on site. See statement by the Polish doctor Dr. Bernhard Lauber, Trials of war criminals before the Nuernberg Military tribunals under Control Council Law No. 10, Volume V/l, Washington 1950, p. 414.

37 Cf. letter from the head of the Main Administration for Military Intelligence tion, Lieutenant General Ivan I. Ilyitshov, to the Chief of the General Staff of the Red Army, Army General Antonov, dated 3/23/1945, distribution list: Stalin, Molotov, Antonov, Archives of the President of the Russian Federation, fund 93, department 81 (45), list 37

38 See service calendar Walther Gerlach, March 1945, Deutsches Museum Munich.

39 Minutes of the questioning of Ms. Clare Werner by the Arnstadt district council, a working group of the SED district leadership and the working group of the Castle and Local History Museum on May 16, 1962, local history museum Veste Wachsenburg (Holzhausen).

40 Cf. Vladimir Chikov, Gary Kern, Perseus, pp. 122f.

41 See Robert Chadwell Williams, Klaus Fuchs. Atomic Spy, Cambridge 1987; Joseph Albright, Marcia Kunstell, Bombshell. The secret story of America's unknown atomic spy conspiracy, New York 1997; Christopher Andrew, Vasily Mitrokhin, The Black Book of the KGB. Moscow's struggle against the West, Berlin 1999.

42 Cf. V. Vizgin (ed.), The history of the Soviet nuclear project, Moscow 2002 (Russian).

43 Cf. IA Andryushin, AK Shernyshev, JA Yudin, Ukrozhdeniye Yadra (Russian), The Taming of the Atomic Nucleus, Saransk 2003.

44 On Iljitshov's biography, see Helmut Roewer, Stefan Schäfer, Matthias Uhl, Lexikon der Secretdienste im 20. Jahrhundert, Munich 2003, p. 214.

45 Letter from the Chief of the Head of the Military Intelligence Agency, Lieutenant General Ivan I. Ilyitshov, to the Chief of the General Staff of the Red Army, General Antonov, 11/15/1944, distribution list: Stalin, Molotov, Antonov. Archives of the President of the Russian Federation, fund 93, department 81 (45), list 37.

46 ibid.

47 Cf. letter from the head of the main administration for military reconnaissance tion, Lieutenant General Ivan I. Ihtshov, to the Chief of the General Staff of the Red Army, General Antonov, dated 3/23/1945, distribution list: Stalin, Molotov, Antonov, Archives of the President of the Russian Federation, fund 93, department 81 (45), List 37. Both this report and the November 1944 report were incorrectly dated in the volume by LD Ryabev (ed.), Atomnij Projekt CCP (Das Soviet Atomprojekt 1938-1945), Zweiter Halbband, Moscow 2002, p. 261.

48 ibid.

49 ibid.

50 Cf. Archive directory on German reactive technology, which was handed over to the cadre administration at the Central Committee of the CPSU (Georgij Malenkov) in preparation for the evaluation by the special committee at the USSR Council of Ministers, RGASPI Moscow, May 1946.

Remarks

51 See statement by Igor Kurchatov on documents “about a German atomic bomb” received from the Red Army General Staff’s reconnaissance headquarters, March 30, 1945, in: LD Rjabev (ed.), Atomnij Projekt CCP (The Soviet Atomic Project 1938-1945), second half volume, Moscow 2002, pp. 260f.

52 ibid.

53 ibid.

54 Cf. Erich Schumann, »The Truth«, p. 4.

55 Cf. Christina Eibl, Der Physiochemiker Peter A. Thiessen, p. 181f.

56 Cf. Gitta Sereny, Albert Speer, Munich 1995, pp. 573f.

57 Cf. Report of the head of the department of the special camps of the SMAD, Colonel Sviridov, No. 00400 of June 11, 1946 to the Deputy Interior Minister of the USSR Colonel General Serov, GARF, Fund 9409, Catalog 1, File 14, Sheet 72.

58 We thank Prof. Reinhard Brandt for pointing this out. The symptoms described can also be found in the NATO handbooks on the medical aspects of nuclear weapons testing.

59 Cf. measurement logs by Dr. Dirk Schalch.

60 Conversation with Prof. Dr. Uwe Keyser on January 20, 2005 in Braunschweig.

61 Letter from Prof. Walter Seifritz dated November 12, 2004.

62 discussions were held with: Prof. Dr. Arthur Scharmann (University of Giessen), Prof. Reinhard Brandt (University of Marburg), Prof. Friedwardt Winterberg (University of Nevada Reno), Prof. Uwe Keyser (University of Braunschweig), Prof. Walter Seifritz (Hausen/ Switzerland).

63 Cf. letter from Prof. Reinhard Brandt of November 16, 2004.

64 Cf. Matthias Muckel, expert opinion on the evaluation of the aerial photographs dated Ohrdruf military training area, Hanover 2004.

65 Conversation with Prof. Dr. Friedwardt Winterberg on October 2nd, 2004 in Constance.

66 Prof. Ulrich Schmidt-Rohr refers to this variant in a letter to the author dated July 6, 2004.

67 Cf. letter from the head of the Main Directorate for Military Intelligence, Lieutenant General Ivan I. Ilyitshov, to the Chief of the General Staff of the Red Army, General Antonov, dated March 23, 1945, distribution list: Stalin, Molotov, Antonov, Archives of the President of the Russian Federation , Fund 93, Division 81 (45), List 37.

68 Cf. Walter Seifritz, Nuclear explosive devices, p. 146.

69 See Section 3.1.

70 Letter from Ingeborg Brandt to Karl Spietz dated October 20, 1995, Heimatmuseum Friedland, no. 157.

71 Cf. Erich Schumann, »The Truth«, Part II.

72 Which compression factor was reached? Even with a factor of two, the critical mass would be significantly reduced. The critical mass after compaction is calculated by dividing it by the compaction factor to the power of two. So for a U235 sphere with a reflector, this would be 20 kilograms divided by 4 = 5 kg. However, these values refer to highly enriched uranium.

With optimal configuration of explosives, fissile material and reflector

compressions of 3 to 5 are possible. This reduced the critical amount of fissile material by a factor of ten to twenty.
In the most favorable case, with plutonium one gets in the range of a few hundred grams. (Walter Seifritz, Nukleare Sprengkörper, Munich 1984, p. 26) However, such values may not have been achievable in 1945.

73 discussions were held with: Prof. Dr. Friedwardt Winterberg, Prof. Dr. Walter Seiritz; Prof. Dr. Ulrich Schmidt-Rohr; Prof. Dr. Reinhard Brandt, Prof. Dr. Gerhard Fussman; Prof. Dr. Karl Heinz Lindackers. I asked Professor Friedwardt Winterberg for an assessment of the construction description: "So you had a shell made of enriched uranium surrounded by explosives. The shaped charge is only used here to increase the implosion of the spherical shell.
But the amount of U235 available for the experiment alone would not have been large enough to trigger an atomic bomb explosion as a critical mass. Now you have this neutron source in the center, and then you have heavy hydrogen. Now it is entirely conceivable that a certain coupling occurs between a thermonuclear reaction, which is not yet an ignited thermonuclear reaction, and the fission reaction. In this case, the energy yield is greater. A lot more highly enriched uranium would have had to be used to get a real nuclear explosion. From a physical point of view, the concept was pretty clear.« (Interview with Friedwardt Winterberg on September 23, 2004 in Constance)

74 Interview with Prof. Friedwardt Winterberg on September 23, 2004 in Konstanz.

75 There are even details in the design description that can be found in later H-bomb designs. This affects the principle of the tappet from U235. This plunger serves as an ignition pill for the fusion material lithium deuterite. Friedwardt Winterberg conceived such a design in 1952. See Kerntechnik, Vol. 34 (1979)12

76. The enrichment process using centrifuges can be additive, ie material that has already been enriched in one run is then fed in again. The degree of enrichment of 13 percent U235 detected in Ohrdruf corresponds almost to a doubling of the degree of enrichment of 7.5 percent achieved by Harteck's group with the ultracentrifuges.

77 Igor Kurchatov, Plan of Scientific Measures of the Physical-Technical Institute of the Ukrainian Academy of Sciences
USSR for the work on the uranium problem in 1945, in: LD Rjabev (ed.), Atomnij Projekt CCP (The Soviet Atomic Project 1938-1945), second half volume, Moscow 2002, p. 259.

78 Cf. Walter Seifritz, Nuclear explosive devices, Munich 1984; Interview with Prof. Dr. Friedwardt Winterberg on 09/23/2004; interview with prof.
dr Reinhard Brandt on 09/20/2004; Interview with Prof. Dr. Uwe Keyser on September 19, 2004.

79 Cf. Erich Schumann, »The Truth«, Part II.

80 Interview with Prof. Dr. Ulrich Schmidt-Rohr on November 3, 2004.

81 Cf. Erich Schumann, »The Truth«, Part II.

82 Conversation with Prof. Dr. Gerhard Fussmann on September 29, 2004 in Berlin; Interview with Prof. Dr. Ulrich Schmidt-Rohr on November 3, 2004.

References to work by the Diebner group in a barn on the Dornheim estate and the violet light observed there could not be traced any further

to verify. (Statement by Hans Ohler dated July 22, 1962, archive Kreismuseum Veste Wachsenburg)

83 Interview with Prof. Dr. Reinhard Brandt on 09/20/2004; Interview with Prof. Dr. Ulrich Schmidt-Rohr on November 3, 2004.

84 If the degree of effectiveness of the blackbody radiation on the fusion substance is around 5 percent, this results in an energy ejection of 24 tons of TNT (Walter Seifritz, Nukleare Sprengkörper, p. 131).

85 See Chuck Hansen, Nuclear Weapons, Arlington, 1988, p. 37. Later Similar experiments were also carried out in other countries (cf. eg: Nature, Vol. 269, September 29, 1977, p. 370; Nature, Vol. 275, October 12, 1978, p. 476).

86 Cf. Walter Seifritz, Nuclear explosive devices, p. 139f.

87 The factor of the fusion material in a subcritical arrangement is said to be uranium 0.8 + fusion energy 0.2. Sample calculation 10 g of uranium = 200 tons of TNT + 2 grams of fusion material. The explosive effect would be enormous, but we do not assume an ignited thermonuclear reaction, see also the interview with Prof. Friedwardt Winterberg.

88 Cf. Walter Seifritz, Nuclear explosive devices, p. 84ff.; Interview with Friedwardt Winterberg on September 23, 2004 in Konstanz.

89 Ideally, the reaction center was in a vacuum.

90 Cf. Wehrkunde No. 11, 1952, p. 9.

91 Explosives, year 1955, issue 5/6.

92 Military Technical Monthly Bulletins 1960/1, p. 8 ff.

93 We owe the references to Dr. Krehl from the Ernst Mach Institute in Freiburg.

94 Cf. Albert Speer, recollections, p. 427; Gregor Jansen, The Speer Ministry. Germany's armament in war, Frankfurt/M., Berlin 1968, p. 309.

95 Cf. Matthias Schmidt, Albert Speer, p. 434.

96 Cf. Joseph Goebbels diary, part 2, vol. 15, p. 321.

97 See daily calendar Heinz Linge, IfZ Munich, MA 147.

98 Bormann's presence is confirmed in his duty calendar. There it is noted for February 21, 1945: »Fuehrer Headquarters«. See GARF Moscow, fund 9401, opis 2, delo 97, sheet 39.

99 Interview with Heinz Schurmann on November 6, 2003.

100 Cf. Jochen von Lang, The Secretary. Martin Bormann: The man who ruled Hitler, Munich 1990, p. 308f.; Rudolf Jordan, Experienced and suffered, Leoni 1977, p. 253; Karl Wahl, Patriots or Criminals, Augsburg 1973, p. 158.

101 Cf. Alexander Orlow, »Wonder Weapons«. Delusional Hopes of the Fuehrer, Moscow 1999 (Russian), pp. 258f. At this point, Orlov quotes from the transcript of Hitler's speech of February 24, 1945. This speech does not exist in German archives.

102 In memoir literature, but also in contemporary historiography this visit to the front was often wrongly dated. Below speaks of February 15th

(probably means March 15), Domarus writes of March 11.
According to Gunsche and Linge's statements, the visit took place on March 27 (GARE, Fond 9401, opis 2, delo 555), which cannot be correct, since General Hübner, who was named by Günsche and Linge as a participant in the meeting with Hitler mentioned on the Oder front, was already on the western front at that time. The visit was correctly dated, namely March 3, in Martin Bormann's service calendar (GARF, fund 9401, opis 2, delo 97, sheet 40). On March 11, at 3:30 p.m., Bormann was to report to Hitler, and in the evening Goebbels was with Hitler for several hours (Joseph Goebbels Diary, Part 2, Vol. 15, p. 487).

103 Quoted from: Henry Picker, Hitler's table talks in the Führer's headquarters 1941-1942, Stuttgart 1963, p. 492; Similar: Hanns Schwartz, Focus on the Führer Headquarters, Kiel 1998 p. 25ff.
104 Cf. Ian Kershaw, Hitler 1936-1945, p. 1279.
105 Cf. BArch Berlin-Lichterfelde, NS 19, No. 1793, Bl. 5, 13.
106 Interview with Werner Grothmann on June 8, 2002. Recorded by Wolf Krotzky.
107 Quoted from: Felix Kersten, Samtel med Himmler. Minnen Fran Tredje Riket 1939-1945, Stockholm 1947, pp. 279f.
108 Quoted from: Heinrich Schwendemann, Architect of Death, in: Die Zeit from 10/28/2004.
109 Quoted from: Gregor Jansen, The Ministry Speer. Germany's Rüs tion in war, Berlin 1968, p. 312.
110 Quoted from: Gitta Sereny, Struggling with the truth – Albert Speer and the German trauma, Munich 1995, p. 563.
111 Cf. Roger Manvell, Heinrich Fraenkel, Heinrich Himmler, London 1965, p. 215.
112 Cf. the memoirs by Count Folke Bernadotte, which should be interpreted with caution, Das Ende. My negotiations in Germany in the spring of 1945 and their political consequences, New York 1945; Walter Schellenberg, Notes, Wiesbaden 1979, p. 170ff.
113 Cf. Walter Schellenberg, Notes, p. 400.
114 Cf. service calendar Walther Gerlach, March 22, 1945, Deutsches Museum Munich.
115 Cf. Thomas Powers, Heisenbergs Krieg, p. 555.
116 Cf. report by Paul Rosbaud of August 5, 1945, Samuel A. Goudsmit Papers, Folder 42, Box 28, Niels Bohr Library, American Institute of Physics, College Park.
117 Cf. Martin Bormann service calendar, Part II, Moscow Special Archive, 940-2-57, p. 32-48.
118 Cf. service calendar Walther Gerlach, March 23, 1945, Deutsches Museum Munich.
119 Cf. letter from Graue to Gerlach, March 19, 1945, re: Schmellenmeier project, BArch Berlin-Lichterfelde, R 26 III, no. 516 a.
120 Cf. Dieter Hoffmann (ed.). Operation Epsilon, p. 158.
121 Quoted from: Report by Paul Rosbaud of August 5, 1945, Samuel A. Goud Smith Papers, Folder 42, Box 28, Niels Bohr Library, American Institute of Physics, College Park.

Remarks

122 Cf. Minutes of the questioning of Peter Fritsch from March 1968, Kreismuseum Arnstadt.

123 Cf. duty calendar Martin Bormann, GARF Moscow, fond 9401, opis 2, delo 97 , Bl. 43. On 26.3. Bormann met with Himmler and Thu ringer Gauleiter Sauckel, after which he held talks with General Krebs about transports. On the following day, too, he discussed "transport problems" with Krebs.

124 Interrogation record of Elsbeth Müller dated May 14, 1969, BStU, Erfurt, AS 10/71, Vol. II, Bl. 33.

125 See statement Siegfried Maron, BStU, MfS IX/11, AV 7/85, vol. 40, B1.13.

126 Minutes of the questioning of Peter Fritsch from March 1968, district museum Arnstadt.

127 Cf. Minutes of the questioning of Klara Weinschenk (Bittstedt) and Marhs Witzmann (Wolfis) from 1968, Heimatmuseum Veste Wachsenburg (Holzhausen).

128 Cf. Ian Kershaw, Hitler, pp. 1016f.

129 Cf. Walter Roland, Bewegte Zeiten, Stuttgart 1978, p. lOlff.

130 Cf. Albert Speer, recollections, Berlin 1969, pp. 452ff. spear gives whether Intentionally or not, at this point, that he went to Thuringia on March 28th. On the other hand, a few pages after this admission, he claims to have been in Berlin on the evening of March 27, and puts this in connection with Kammler's appointment as Hitler's special envoy for the Me 262, which took place that day. Other sources document that Speer killed himself one day wrong.

131 Cf. BArch Berlin-Lichterfelde, R3 No. 1661, Bl. 56.

132 Cf. Gitta Sereny, The struggle with truth, p. 566.

133 Cf. Joachim C. Fest, Speer - Eine Biographie, Frankfurt/M. 2001, p. 461. Immediately after this one-to-one conversation, which lasted until the early morning of the 30th, Speer received a telex from the head of transport dated March 29, 1945. This is only interesting for us in that it means that the date of the conversation on the night of the 29th to the 30th March is confirmed.

134 Cf. Albert Speer, recollections, p. 455.

135 Cf. BArch Berlin-Lichterfelde, NS 3, No. 457, Bl. 5.

136 Cf. service calendar Walther Gerlach, March 28, 1945, Deutsches Museum Munich.

137 See Peter Padfield, Himmler. Reichsfuhrer SS London 1990, p. 576f.; Baldur von Schirach, I believed in Hitler, Hamburg 1967, p. 310.

138 Diary of Joseph Goebbels, part 2, vol. 15, p. 614.

139 Cf. Interview with Werner Grothmann on June 8, 2002. Recorded by Wolf Krotzky. Himmler's service calendar ends on March 15, 1945, so that the statement cannot be verified.

140 Cf. Peter-Ferdinand Koch, Himmler’s gray eminence – Oswald Pohl and the SS Economic and Administrative Main Office, Hamburg 1988, pp. 196ff.

141 Cf. Minutes of the interrogation of Walter Hermann, October 28, 1945, archive of the MPG, Diebner Group, No. 19208.

142 Cf. Irving Papers, document 31 605, Deutsches Museum Munich.

143 Cf. Klaus Dietmar Henke, The American Occupation, p. 660; Charles B. MacDonald, The Last Offensive (Washington 1973), p. 342.

144 The military intelligence chief of the Third Army, General Sibert, released the following information on April 1: "With his immediate surroundings (probably Goebbels, Goering, Keitel, Jodl and Dönitz), Hitler is planning an uncompleted one about 3 km from the city headquarters bunker (code name S III) in the middle of [Arnstadt] on the main road leading west. The bunker is said to have five underground tunnels" (NA Washington, RG 407. War Diary of the 80th US Infantry Division, Appendix to G-2 Report No. 211 of April 3, 1945). Patton therefore urged his commanders on to the highest level of combat readiness - "Here you would have the greatest opportunity in the history of the world to cover yourself with laurels" (George S. Patton, War, as I experienced him, Bern 1950, p. 202). What he meant by that seems clear - the capture of Hitler or other Nazi greats.

145 Historians have always associated Gerlach's statement about a functioning reactor with Heisenberg's reactor in Haigerloch.
That is not conclusive, because those involved spoke of Stadtilm. "It had to be acted quickly. Because the decisive test with the uranium machine had been achieved in Stadtilm (Helmut J. Fischer, fire brigade for research, IfZ Munich, Ms. 321/1-4). Fischer later deleted these sentences. (Cf. Helmut J. Fischer: Hitler and the atomic bomb. Report of a contemporary witness, p. 71) Whether Stadtilm, Haigerloch or Gottow was meant remains unclear.

146 Quoted from: Interview with Georg Graue on April 4, 1966, IfZ Munich, Irving Collection.

147 Cf. Albert Speer, recollections, p. 497ff.

148 Interview with Jörg Diebner on September 15, 2003 in Flensburg.

149 Cf. Erwin Respondek, Overview of the status of scientific work in Germany on the atomic bomb (until May 1945), in: NA Washington, RG 226, Ent. 210, Box 465.

150 memorial report by Werner Czulius (without the aid of documentation menten), archive of the MPG, no. 19207.

151 Cf. Protocol of Walter Hermann's interrogation, October 28, 1945, MPG archive, Diebner Group, no. 19208. The escape of the Diebner group was meticulously reconstructed by the Soviet secret service in autumn 1945. Above all, the Soviets wanted to know where the group's nuclear material and documents had gone.

152 Cf. Irving papers, no. 31 605 (handwritten Irving) v. February 28, 1966, German Museum Munich.

153 Siegfried Hülsmann: Report on the trip by the working group by Dr. Thieves from Stadtilm to Oberbayern, Leipzig November 4, 1945, MPG archive, no. 19207.

154 Cf. Friedrich Berkei, Georg Hartwig, report on the work carried out in Germany on the production of nuclear energy, September 12, 1945, archive of the MPG, Austria 2, p. 298f 155 Cf. report by Georg Siebert of November 5, 1945, Archive of the MPG, no. 19207.

156 Cf. Interview with Karl Otto Saur on October 24, 1965, Irving Papers, 31570, German Museum Munich. Note on the interrogation of Karl Otto Saur on February 4, 1947, StA Nuremberg, Rep. 502, Bl. 16.

Remarks

157 Cf. Report on the radium transport of the US high command from the PTR for the SMA Thuringia, Stadtkommandantur Weida, July 1945, BArch Berlin-Lichterfelde, N-5, No. 14.

158 Handwritten draft of the telegram from Wardenburg to Goudsmit of April 12, 1945, Deutsches Museum Munich, Irving-Papers, 311153.

159 Cf. Michel Bar-Zohar, The hunt for German scientists (1944-1960), Berlin 1965, p. 89.

160 Cf. Gerhard Remdt, Gunter Wermusch, Puzzle Jonastal, p. 140f.

161 Quoted from: ibid.

162 Cf. Joachim C. Fest, Hitler. A biography, Frankfurt/M. 1973, p. 989 163 Interview with Karl Otto Saur on October 24, 1965, Irving Papers, 31570, Deutsches Museum Munich.

164 Agency report from the source "Jäger" from the surveillance of Hitler's chief pilot Hans Baur, December 17, 1945, GARF Moscow, 9401/2/550, p. 128 (back). I am grateful to Matthias Uhl (Berlin) for referring me to these sources.

165 Agency report from source "B-III" from the surveillance of Hitler's boss pilot Hans Baur, February 19, 1946, GARF Moscow, 9401/2/550, sheet 147 (back).

166 Cf. CIC documentation »Adolf Hitler« 1944-1953, interview with Hans Fegelein of September 21, 1945, IfZ Munich, F 135/3, p. 384ff.

167 ibid.

168 See Ian Kershaw, Hitler, Vol. 2, p. 1034.

169 Cf. Philip Henshall, The nuclear Axis, p. 50. Henshall moves out of the The handover of files led to the conclusion that the Stadtilm documents must have been exceptionally important papers. He also assumes that Alsos had found a betatron, heavy water and enriched material in Stadtilm. His source interpretation is incorrect at this point. It was just a matter of putting files together according to certain keywords.

170 Cf. Interview with Ilse Haxel on February 4, 2004.

171 Cf. Siegfried Hülsmann: Report on the trip by the working group from dr Thieves from Stadtilm to Upper Bavaria, Leipzig 4.11. 1945, MPG archive, no. 19207.

172 Cf. interview with Prof. Kirchner v. 10/22/1965, Irving Papers, MA 1298/17, Doc. 31511, Deutsches Museum Munich. Shortly after the war, some uranium cubes turned up in the Garmisch area. A black market in the rare metal began. The American occupation authorities soon put an end to this activity.

173 Report by Georg Siebert of November 5, 1945, MPG archive, no. 19207; report by dr Steinhaus to Lieutenant Colonel Garkuschka dated September 24, 1945, BArch Berlin-Lichterfelde, DF 5, No. 14. The Americans found out about it and recovered the treasure on June 26, 1945. One day later, the radium preparations were flown to the USA.

174 Cf. ibid.

175 Cf. letter from Jörg Diebner of January 3, 2004 to the author 176 Quoted from: Dieter Hoffmann, Operation Epsilon, p. 93f.

177 See www.childrenofthemanhattanproject.org/VET_ARCHIVES/More/ 12-03,previti.htm

178 Cf. Telschow diary: Journey Göttingen-Erfurt-Stadtilm, archive of MPG, Division III, Rep. 83, No. 286.
179 ibid.
180 See Chapter 5.

Part Five: AFTERNOBS

1 Cf. Simmons Project Report, NA Washington, RG 226, Entry 210, Box 33.
2 US National Archives, Southeast Region, East Point, Ga, Memorandum from NE Bradbury to N. Ramsey, 18 April 1945, A-84-019-82-16, in: Carter P. Hydrick, "Critical Mass."
3 Specialists brought to the USA under the Paperclip program, November 20, 1950, NA Washington RG 330, No. 30.
4 Cf. Wolfgang Hirschfeld, Enemy trips: The log book of a U-boat radio operator, Berlin 1991; Wolfgang Hirschfeld, The Last Boat: Atlantic Farewell, Munich 1995; Joseph Mark Scalia, Germany's last Mission to Japan, Annapolis 2000. Carter P. Hydrick wrote an interesting study. It is entitled »Critical Mass« in 1998. The Real Story of the Birth of the Atomic Bomb and the Nuclear Age has been posted online. Meritorious here is the evaluation of Navy files on the loading of U-234 and the analysis of the Oak Rigde files. Unfortunately, in the second part of his study, Hydrick got carried away with wild conspiracy theories and thus devalued his work.
5 Cf. Joseph Mark Scalia, Germany's last Mission to Japan, p. 35.
6 Cf. Specialists brought to the USA under the Paperclip program, 11/20/1950, NA Washington RG 330, No. 30; Heinz Schlicke, Curriculum Vitae 2004.
7 First lecture given by Dr. Schlicke at the Navy Department, July 19 1945
8 Pages 26-56 of this report are missing from the American source.
9 Cf. IS Drovennikov, SW Romanov, Die Beute Uran oder Die History of a business trip. The history of the Soviet nuclear project, documents, memories, research, Moscow 1998, pp. 215ff. 10 Translation of a letter from the German physicist M. von Ardenne dated May 10, 1945 to IV Stalin about his agreement to cooperate with »research institutions of the USSR«; Document #346.
11 Cf. Pavel Oleynikov, p. 6.
12 Quoted from: The history of the nuclear project, Moscow 1998 (Russian), p. 177.
13 Cf. letter from the deputy People's Commissars of Internal Affairs of the USSR AP Zavenyagin and VA Machnev of June 18, 1945 to LP Beria about the dispatch of German specialists to the USSR and the removal of equipment and materials from Germany, document No. 363.
14 Letter from the employee of laboratory No. 2 GN Flerov to IV Kurchatov about the preparation of equipment for work in Germany dated May 21, 1945, in: LD Rjabev (ed.), Atomnij Projekt CCP (Das

Soviet nuclear project 1938-1945), second half volume, Moscow 2002, document no. 353 (the letter may have been written a few days before May 21, the date is not clear), pp. 310f.

15 ibid.

16 Cf. letter from GN Flerov to IW Kurchatov about the stay in Dresden and the organization of further work from May 29, 1945, document no. 355, LD Rjabev (ed.), Atomnij Projekt CCP, p. 312ff.

17 ibid.

18 ibid.

19 Cf. Vladimir Tschikow, Gary Kern, Perseus: Espionage in Los Alamos, Berlin 1996, p. 242.

20 Cf. LD Rjabev (ed.), Atomnij Projekt CCP (The Soviet Atomic Project 1938-1945), second half volume, Moscow 2002, p. 708.

21 Cf. Dieter Hoffmann (ed.), Operation Epsilon. The Farm Hall Protocols or the Allies' Fear of the German Atomic Bomb.

22 Otto Hahn, Mein Leben, Munich 1986, p. 173.

23 Cf. Charles Frank (ed.), Operation Epsilon, The Farm Hall Transcripts, Berkeley 1993; Dieter Hoffmann (ed.), Operation Epsilon. The Farm-Hall Protocols or the Allies' Fear of the German Atomic Bomb, Berlin 1993; Jeremy Bernstein, Hitler's Uranium Club, The secret records at Farm Hall, Woodbury 1996.

24 Werner Heisenberg, The part and the whole, Munich 1969, p. 264.

25 Quoted from: Dieter Hoffmann (ed.), Operation Epsilon, p. 332.

26 Quoted from: ibid., p. 64.

27 Quoted from: ibid., p. 62.

28 Quoted from: ibid., p. 125f.

29 Quoted from: ibid., p. 147.

30 Quoted from: ibid., p. 148.

31 Quoted from: ibid., p. 154.

32 Cf. Otto Hahn, diary 2, August 7, 1945, p. 22f., MPG archive, section III, republic 70

33 Quoted from: Dieter Hoffmann (ed.), Operation Epsilon, p. 157.

34 Quoted from: ibid., p. 158.

35 Quoted from: ibid., pp. 153, 155, 169.

36 Cf. Erich Bagge, Kurt Diebner, Kenneth Jay, From uranium fission to Calder Hall, Hamburg 1957, p. 58 37 Cf. Mark Walker, Uranmaschine, p. 263ff.

38 Cf. Statement for discretionary use as required. After the return to Germany of the German physicists now detained in this country, PRO Kew, FO 800, no. 565

39 Cf. Telegram re: German Scientists, PRO Kew, FO 800, No. 565.

40 Cf. Top secret cyber telegram from October 26, 1945; PRO Kew, FO 800, No. 565.

41 Cf. Top secret cyber telegram from November 1, 1945, PRO Kew, FO 800, No. 565.

42 Cf. Top secret cyber telegram from December 2, 1945, PRO Kew, FO 800, No. 565.

43 Statement for discretionary use as required. After the return to Germany

of the German physicists now detained in this country, PRO Kew, FO 800, no. 565.

44 Cf. Kammler's radio message to Schurmann of April 23, 1945, IfZ, MA 382, No. 2664.

45 Memo from Jürgen Thorwald's conversation with Gunter d'Alquen of March 13/14, 1951, IfZ Munich, ZS 2/1, Bl. 71.

46 Cf. Rainer Fröbe, Technokrat, p. 316. The author claimed this without any source evidence.

47 Cf. Brief report: Transfer by SD from Tucheler Heide to Italy, Headquarters USSAF in Europe August 19, 1947, NA Washington, RG 319, Entry 134 A, Box 2829.

48 Cf. handwritten report by Franz Kammler.

49 Cf. Joachim Fest, Speer, p. 391.

50 IMT, Vol. XVI, p. 531.

51 ITM, Vol. XXII, p. 460ff.; Albert Speer, Memoirs, p. 521ff.

52 Cf. Joachim C. Fest, Speer, p. 450f.

53 Cf. letter from Erich Schumann dated January 5, 1957, Schumann estate.

54 Cf. letter from Prof. Max Planck dated October 19, 1946 to the lecturers' committee of the University of Göttingen, Schumann estate.

55 Cf. letter from Prof. R. Purchase (Research Branch, Economic Sub Commission) of August 15, 1947.

56 Cf. Werner Luck, Erich Schumann and the student company of the HWA, in: Dresdner Contributions to the History of Engineering Sciences (2001), No. 27, p. 27ff.

57 We have Herbert Kunz (Brunswick) to thank for the fact that parts of Erich Schumann's estate were preserved at all. He had studied and worked with Schumann during the war.

58 »Memory support«, Bl. 15, Erich Schumann estate.

59 Cf. »Memory support«, Bl. 15, Schumann estate.

60 Cf. Erich Schumann contract with Rowohlt Verlag dated September 23, 1948, Erich Schumann estate.

61 Cf. Mark Walker, Uranmaschine, p. 246.

62 Cf. letter from Schumann to Winkhaus dated July 21, 1950, estate Eric Schumann.

63 See letter from Schumann to attorney Dr. Sharper from 16.8.1950, estate of Erich Schumann.

64 Cf. letter from Schumann to Nischk dated April 24, 1952, Erich estate Schumann.

65 Cf. »Memorial Protocol«, p. 17, Erich Schumann estate. the The reason for contacting interested parties from abroad is interesting: Since the Federal Republic was not sovereign in these questions, negotiations should be carried out with Americans if possible. "European powers are much more at risk from the point of view of susceptibility to influence from the East. Based on location and political leanings, Spain could be an option. The last country is Switzerland, even though it is known that there is a well-developed Soviet espionage system [...] Contact with the German government offices was forbidden because it had to be assumed that this would

in conflict with the Control Council laws against exploitation in Germany." 66 Cf. "Memory Support", Bl. 35, Nachlass Erich Schumann.

61 Cf. letter from Winkhaus to Schumann October 18, 1957, Erich estate Schumann.

68 See letter from Schumann to Trinks dated July 14, 1957, Erich estate Schumann.

69 See letter from the BMV, Public Relations Department, dated March 11, 1999; Wehrtechnik 1975/11, p. 573.

70 Cf. The Sydney Morning Herald of 17.07.1999. More than 130 German scientists went to Australia after the war (letter from Geard Ryle to the author dated 05/01/2003.)

71 Cf. Wayne Reynolds, Australia's Bid for the Atomic Bomb, Melbourne 2000; Australian Nuclear Tests', in: Joan Beaument, The Australian Centenary of Defence: Statistics, South Melbourne, 2001.

72 Munich district court archive, file S, tribunal file Ohne worries.

73 Cf. Who was who in the GDR? Bonn 2000, p. 850.

74 Cf. Michael Grüttner, Biographical Encyclopedia on National Socialist Science Policy, Heidelberg 2004.

75 Cf. Bernd A. Rusineck, The Physicist and DFG Vice President Walther Gerlach (1889-1979). A biography, www.geschichte.uni-freiburg.de.

76 Hans-Reinhard Bachmann, Helmut Rechenberg (ed.), Walther Gerlach (1889-1979). A selection from his writings and letters, Berlin 1989, p. 227.

77 Cf. David Irving, The Dream, p. 302.

78 Cf. Interrogation of Geist, August 17/18, 1945, Summary, NA Washington, RG 319, Entry RR, Box 58.

79 Friedrich Geist, Report I: Economic War Preparation, NA Washington, RG 319, Entry RR, Box 58.

80 Personnel file of Friedrich Geist, BA-MA Freiburg, pers. 6, No. 10352.3.

81 Cf. Joachim Radkau, Rise and Crisis of the German Nuclear Industry 1945-1975, Hamburg 1983; Wolfgang D. Müller, History of Nuclear Energy in the Federal Republic of Germany, Vol. 1, Stuttgart 1990.

82 Cf. Joachim Radkau, Rise and Crisis, p. 97.

83 See telegram from the JIOA to the Department of Army in Washington dated April 1, 1953, NA Washington 330, JIOA 1 B, 66.

84 Cf. Manfred Herrmann, Project Paperclip. German scientists in the service of the US armed forces after 1945, dissertation at the University of Erlangen-Nuremberg, p. 644.

85 See Research branch, Zonal Office of Economic Adviser. Subject: UZ III B, February 21, 1946, PRO Kew, FO 1032, No. 205.

86 Cf. Military Technical Monthly 1965, Issue 10, p. 396.

87 Cf. letter from Kurt Diebner to the tax office for traffic taxes in Hamburg dated September 4, 1950, Deutsches Museum Munich, NL Gerlach 080/292.

88 Cf. letter from Kurt Diebner to Walther Gerlach dated September 7, 1950, ibid.

89 ibid.

90 Cf. Günter Nagel, Nuclear Tests in Germany, p. 231.
91 Cf. Kurshatov's letter to Beria dated May 8, 1945, in: The Soviet Atomic Project 1938-1945, Vol. I, Moscow 2002, pp. 284f.
92 Report of Major General VA. Kravcenko (NKVD) from late 1945, in: The Soviet Atomic Project 1945-1949, Vol. II, Moscow 2002, p. 340.
93 Interview with Jörg Diebner on September 9, 2003 in Hoxter.
94 Cf. handwritten letter from Kurt Diebner to Walther Gerlach dated February 22, 1952, Deutsches Museum Munich, NL Gerlach 080/292.
95 See letter from Gerlach to Diebner dated February 28, 1952, Munich, ibid.
96 ibid.
97 Cf. Gunter Nagel, Nuclear Tests, p. 231.
98 Cf. ibid., p. 232.
99 Conversation with Friedwardt Winterberg on September 23, 2004 in Konstanz.
100 Vgl. Patentamt Berlin, Patentschriften bzw. Auslegeschriften: 939889, 955880, 1020127,1022709, 1058643,1010202,1016856,1074771, 1414091,1414091,1105075, 1032856,1031440,1083942, 1042145, 1092448,1058645,1215822,102587,1163465 , 1071857.
101 Cf. Conversation with Jörg Diebner on September 9, 2003 in Hoxter.
102 Cf. patent specification of August 28, 1956 (withdrawn) "Method for the ignition of thermonuclear reactions by means of convergent detonation compression shocks", patent specification of November 30, 1956 (withdrawn) "Method for the electromagnetic ignition of thermonuclear nuclear fuels", private archive Jörg Diebner (Flensburg).
103 Patent specification of August 28, 1956 (withdrawn) »Method for igniting thermonuclear reactions by means of convergent detonation shocks«.
104 Cf. Patent Office Berlin, Auslegeschrift 1414759.
105 Cf. Mark Walker, Uranmaschine, p. 243ff.
106 Cf. ibid., p. 244.
107 Werner Heisenberg, About the work on the technical exploitation of the Nuclear energy in Germany, in: Die Naturwissenschaften, 33 (1946).
108 Cf. Mark Walker, Uranmaschine, p. 245f.
109 Cf. memorandum for the head of SMA Thüringen dated January 16, 1946, MA, 7/84-1-116, sheet 5.
110 Cf. Friedrich Berkei, Georg Hartwig, report on the work carried out in Germany on the production of nuclear energy, September 12, 1945, archive of the MPG, Austria 2.
111 Cf. BStU Berlin, AP 1498/59, Dr. Berkei; On Berkei's post-war biography, see also: Gunter Nagel, Atomversuche, pp. 223ff.
112 See report of December 14, 1956, BStU. General P No. 1498/59.
113 Cf. interrogation protocol with master plumber Erich Rundnagel, BStU, district office Arnstadt, Arnstadt July 8, 1966.
114 Cf. BStU, district office Arnstadt, report: »Research center des Reich Ministry in Stadtilm (School)« of July 8, 1966.
115 Cf. ibid.
116 Cf. BStU, Arnstadt district office, final report of May 6, 1968.
117 Cf. Franz Josef Strauss, The Memories, Berlin 1989, p. 323.

118 Cf. ibid., p. 329.
119 Quoted from: Hans Karl Rupp, Extra-Parliamentary Opposition in the Adenauer Era, Cologne 1970, p. 77.
120 Cf. Wolfgang D. Müller, History of Nuclear Energy, Vol. 1, p. 553f.
121 Cf. Hans-Joachim Radkau, Rise and Crisis, p. 96ff.
122 Cf. ibid. p. 100.
123 Conversation with Friedwardt Winterberg on September 23, 2004 in Konstanz.
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125 Cf. Der Spiegel March 20, 1957.
126 Cf. Günter Nagel, Nuclear Tests, p. 232.
127 Cf. letter from Trinks to Winkhaus dated April 8, 1957, Erich estate Schumann.
128 Kurt Diebner, Fusion Processes Using Convergent Shock Waves - Some Older and Newer Experiments and Considerations, in: Kerntechnik, March 1962, p. 90.

129 Cf. Rainer Eisfeld, Mondsucht, Reinbek 2000, p. 288.
130 Boris Tschertok, Rockets and People, Klitzschen 1998, p. 86.
131 Cf. Matthias Uhl, Stalins V-2, Bonn 2001, p. 217.
132 Cf. ibid., pp. 107ff.
133 Meeting of the Technical Commission on 27.728. March 1946 in Berlin (Russian), Archives of the Korohov Museum, Fund 1, No. 152-46.

SOIL SAMPLING

1 letter from Dr. W. Will to the Ministry of Agriculture, Environment and Regional Planning of the State of Brandenburg on April 5th, 2000, quoted in: Günter Nagel, Atomversuche, p. 317.
2 Cf. measurement protocols Dr. Dirk shells (casting).
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5 Cf. Matthias Muckel, report on the evaluation of the aerial photos from the military training area at Ohrdruf, Hanover 2004.
6 See publications of the Federal Office for Radiation Protection, Environmental radioactivity in the Federal Republic of Germany 1998-2001, No. 27/2003.
7 letters from Dr. Dirk Schalch (Giessen) from 01/29/2005.
8 Cf. letter from Prof. Reinhard Brandt of November 16, 2004.
9 Conversation with Prof. Dr. Uwe Keyser on February 6, 2005 in Ohrdruf.

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Federal Republic of Germany

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Archive of the Humboldt University Berlin

Archive of the Max Planck Society Berlin

Archive of the University of Innsbruck

Contemporary History Library in Stuttgart

Federal Commissioner for the Records of the Former State Security Service of the GDR (BStU)

Federal Archives (BArch) Berlin-Lichterfelde and Koblenz

German Museum Munich

German Patent Office Berlin

Fnedland local history museum

Institute for Contemporary History (IfZ), Munich

Arnstadt district archive

Selected Literature

State Archive Berlin (LAB)

Military archive Freiburg
Museum for Communication Berlin
Siemens archive Munich

City Archive Haigerloch
Nuremberg State Archives
University Archives of Freiburg

Belgium
University Archives Leuven

Great Britain

Public Record Office (PRO), Kew

Israel

Yad Vashem Archive, Jerusalem

Italy

Archivo Centrale dello Stato, Rome

USA

National Archives (NA), Washington, College Park
Hoover Institution Archives (HIA)

Niels Bohr Library, American Institute of Physics, New York
USAF Historical Research Agency, Maxwell AFB Alabama

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Interfoto Munich: panel 2 above, panel 14 above

Bavarian State Library Munich: Table 13

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Deutsches Reich und Europa im November 1942

Das Deutsche Reich

General-gouvernement

Gebiete unter deutschem Machtbereich bzw. Verbündete